

Training in Planning, Monitoring and Evaluation for Agricultural Research Management

Manual 2 Strategic Planning



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1995



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Send us your ideas

Training materials such as these are not finished products but work in progress. They can always be improved. Since we hope to revise them in future, ***the authors and ISNAR would appreciate receiving your comments and suggestions for improving them.*** We would also be interested in learning about your experiences (positive and negative!) using these materials in training and in institutional-change processes.

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Manual 2

Strategic Planning in Agricultural Research Management

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BRASILIA**

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FONAIAP

National Agricultural
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Contents

	Page
Preface	2
Acknowledgments	2
Flowchart for Manual 2	3
Introduction to Manual 2	4
Sequence 1. A Framework	7
• Flowchart for Sequence 1	8
• Introduction	8
• Planning in Latin America and the Caribbean	9
• Conceptual Framework for Planning	10
• Summary	16
Sequence 2. Analyzing Context, Organization, and Gaps	19
• Flowchart for Sequence 2	20
• Introduction	20
• External Analysis	21
• Organizational Analysis	28
• Gap Analysis	33
• Summary	37
Sequence 3. Formulating a Strategic Plan	39
• Flowchart for Sequence 3	40
• Introduction	40
• Formulating the Mission	41
• Formulating the Objectives	45
• Formulating the Policies	49
• Validating the Mission, Objectives, and Policies	50
• Formulating the Strategies	51
• Summary	55
Appendices	57
Appendix 1. Terms Used in PM&E Manuals	58
Appendix 2. Bibliography	61

Preface

During the ISNAR project “Strengthening Agricultural Research Management in Latin America and the Caribbean” a team of individuals representing national, regional, and international organizations produced several publications and training materials on planning, monitoring, and evaluation (PM&E) for agricultural research institutions in Latin America and the Caribbean.

These materials were designed to:

- support learning and training courses and workshops on PM&E;
- facilitate the diffusion of concepts, methods and tools for improving PM&E in the region and elsewhere.

Three types of materials were developed: reference books, training modules, and training manuals. The training *manuals* are intended for course and workshop *participants*; the training *modules* are to be used by *instructors*. In this sense, the manuals and modules are complementary. The manuals present the training objectives and essential subject matter. In the modules, these components are complemented with special sections for instructors, including exercises, transparencies, and technical annexes. Instructors and course participants who want additional information about the topics discussed in the materials can turn to the project’s reference books or to the many references in the course material.

We hope that managers and trainers working in agricultural research will find these materials useful. We hope they will not only distribute them in their institutions but also apply the concepts and tools discussed.

Acknowledgments

The authors would like to express their thanks to the various individuals and institutions that made it possible to produce this training module on strategic planning in agricultural research management.

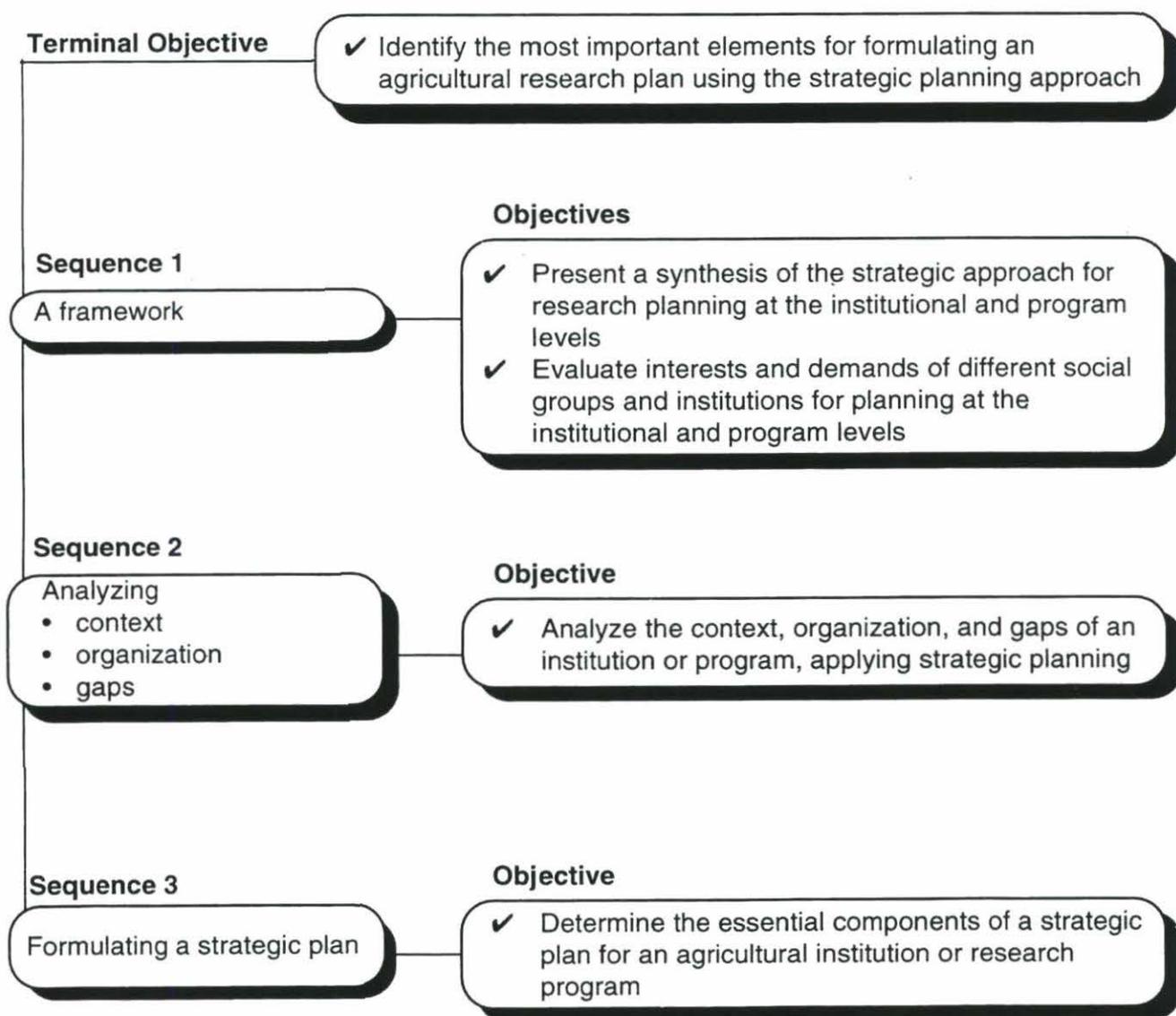
We would like to thank Christian Bonte-Friedheim and Gustavo Nores, Directors General of ISNAR and CIAT, for establishing the inter-center collaboration that facilitated the production of these training materials. We would like to give special thanks to Douglas Horton of ISNAR for his leadership in the project and for giving us the opportunity to participate in it. We are indebted to Juan Cheaz for the efficient arrangements he made for project events and for his dedication and many contributions during preparation of the training materials.

We are thankful to the Inter-American Development Bank (IDB), the International Development Research Centre (IDRC), the Swiss Development Cooperation (SDC), the Technical Centre for Agricultural and Rural Cooperation (CTA), the Government of Spain, and ISNAR for providing the necessary funds for preparing and publishing this module.

We would like to thank Gerardo Häbich, Associate Director for Institutional Relations of CIAT, for the support and hospitality that he arranged for us at CIAT. Vicente Zapata, Train-the-Trainers Project Coordinator, and the entire team of CIAT’s Training Materials Unit guided and supported us in our development as instructors and in preparing this training module. The skill and patience of the CIAT team throughout the numerous revisions of this module are much appreciated. In particular, Sandra del Mar Sacanamboy and Nora C. Mesa demonstrated a high degree of professionalism and dedication and helped us throughout the complex and tedious process of preparing the text and supporting materials. We would also like to thank Flora Stella de Lozada, who ably transcribed the initial materials; Juan Carlos Londoño for his numerous and invaluable contributions to the design and production of the final module and transparencies.

Finally, we would like to express our gratitude to our own institutions, which kindly relieved us from our normal duties to allow us to participate in the various activities in this project, to develop our training skills, and to prepare these training materials.

Flowchart for Manual 2



Introduction to Manual 2

Many public-sector organizations are in a crisis and their future is questioned. Many people believe that the main problem is the lack of funds, reflected in declining budgets. Budgetary problems are indeed serious. But they are not the fundamental cause of the problem. The real problem is that many of the development models that came into vogue in the post-war period are no longer viable.

The notion of “development” is, by and large, a post-war concept. Development efforts, supported by the industrial nations and the newly created system of international agencies, began slowly in the 1950s and expanded substantially in the 1960s. The “Cold War” -- the ideological, political and economic battle of the western and eastern bloc countries -- motivated both sides to “invest” in development assistance in the developing countries.

By the 1970s a sort of economic euphoria swept many developing countries. Focused on productivity gains, development model fostered modernization, urbanization, industrialization and import substitution. In agriculture, this model’s manifestation became known as the “Green Revolution”.

In the 1980s, there was increasing concern for the sustainability of the Green Revolution and its social and environmental costs. By the end of the decade, the prevailing development paradigms -- both in the east and the west -- were called into question as was the very role of the state in development processes.

In the present decade, the world is going through profound social, economic and political upheavals, and there is an intense search for new development approaches.

In the midst of the crisis, many institutions in developing countries are discovering the importance of a “strategic approach” to management that strengthens organizations, and facilitates their adjusting to the needs and challenges of new national and international conditions. This module is designed to introduce the main concepts, methods, and tools of strategic planning (Pfeiffer, *et al.* 1985; David, 1988; Sastoque, 1991; Oliveira, 1992; Peter and Certo, 1993), at the institutional and research program levels.

Strategic planning--planning that incorporates the strategic approach--is not a panacea to resolve all institutional problems. But, if carried out as part of an integral PM&E system, strategic planning has the potential to strengthen and improve the performance of agricultural research institutions.

Manual 2 is divided into three instructional sequences that show how to apply the strategic approach to planning, as shown in the general flowchart. A brief explanation of these three parts follows:

Sequence 1. A framework

This sequence is divided in two parts. The first part is an overview of the present situation of agricultural research planning in Latin America and the Caribbean. It shows the need to incorporate the strategic approach to planning into the management of agricultural research institutions.

The second part presents a conceptual framework for planning and emphasizes the need for a political decision to introduce the strategic approach in planning.

At the end of this sequence, a group of participants dramatizes a situation in which representatives from a national agricultural research institute (NARI) meet with key members of interest groups to hear their demands. The interest groups point out to the NARI representatives the need for institutional change and for a new research program. This exercise provides the basic information for the exercises in Sequences 2 and 3.

Sequence 2. Analyzing context, organization, and gaps

Contextual, organizational and gap analysis are key parts of the strategic approach applied to planning. Prospective context analysis identifies opportunities and threats. Organizational analysis determines strengths and weaknesses. Gap analysis is used to move an institution or program from its present political and institutional situation toward a new, desired situation.

At the end of Sequence 2, the participants carry out a group exercise to identify strengths and weakness, opportunities and threats and gaps, based on the case of a NARI and on the information supplied during the role play at the end of Sequence 1.

Sequence 3. Formulating a strategic plan

This sequence presents a strategic planning approach to formulate an organization's mission, goals, policies, and strategies. At the end of this sequence, participants will carry out a group exercise to formulate the mission, goals, policies, and strategies of a hypothetical NARI, applying the approach explained in the sequence and using the information provided during the role play at the end of Sequence 1. Two groups will formulate a strategic institutional plan for the NARI, and two groups will formulate a strategic plan for a new research program.

The organization of Manual 2 reflects the CIPP model (Mulholland, 1993), which is based on the interrelation of four concepts: context, inputs, processes, and products. The general logic of the module is shown in Figure 1.

The "Context" in Figure 1, is discussed in the first part of Sequence 1, planning in the region. This sequence presents arguments and information necessary for participants to recognize the need for training in planning, with emphasis on the methods for applying the strategic approach to the planning process of agricultural research institutions or programs.

The "inputs" in the Figure are discussed in the second part of Sequence 1 in the framework for planning. Sequence 2 develops the topics of prospective context analysis and organization and gap analyses. The first input, the framework for planning, provides a set of common concepts for all the participants. The three types of analysis deal with strategies for handling the elements and instruments necessary for identifying opportunities and threats of the environment, the internal strengths and weaknesses, and the institutional gaps.

The "processes" in Figure 1 correspond to Sequence 3, which deals with formulating mission, goals, policies, and strategies, —basic components of a strategic plan. Methodological strategies that allow participants to combine the previous inputs in the formulation of the mission, goals, policies, and strategies of an institute or program are also presented.

The "products" expected from the module are: 1) the strategic plan that participants will formulate; 2) a positive attitude towards the application of the strategic approach to planning; and 3) the intention to institutionalize planning.

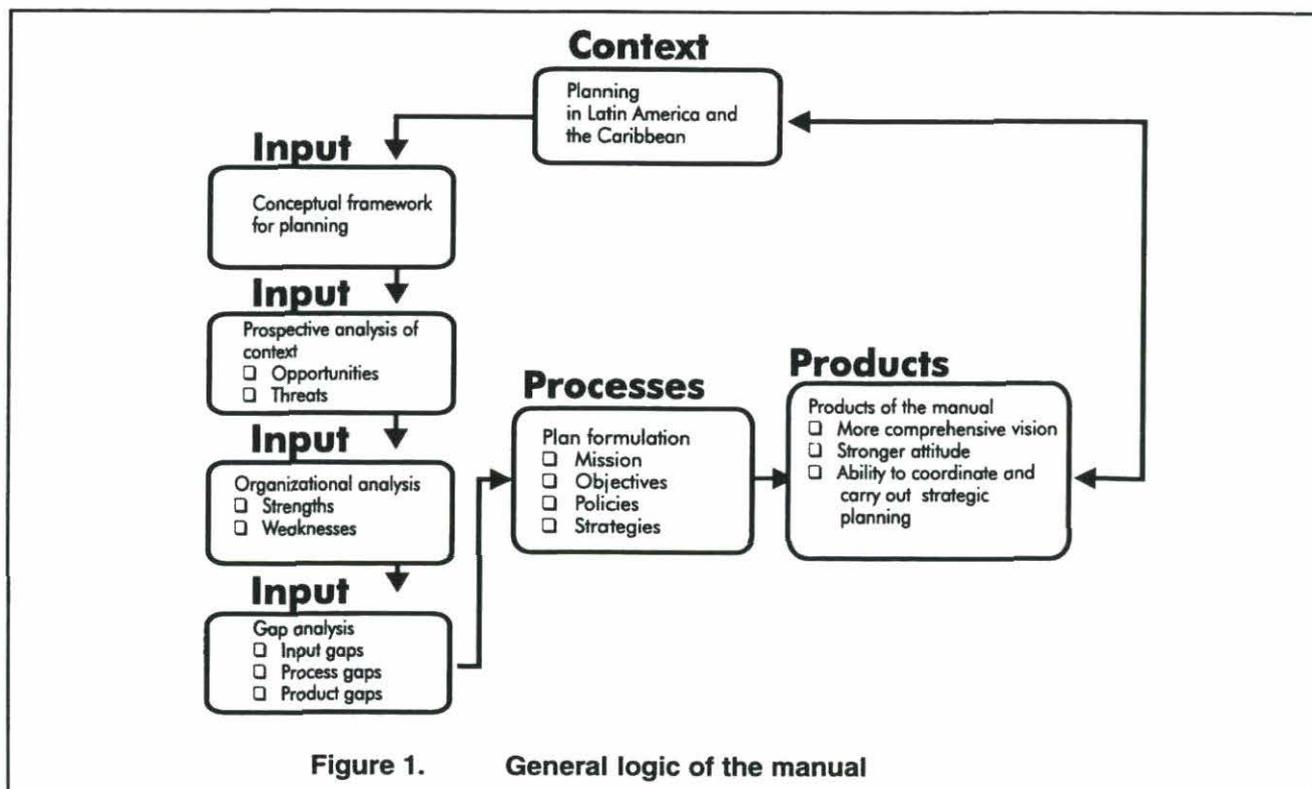
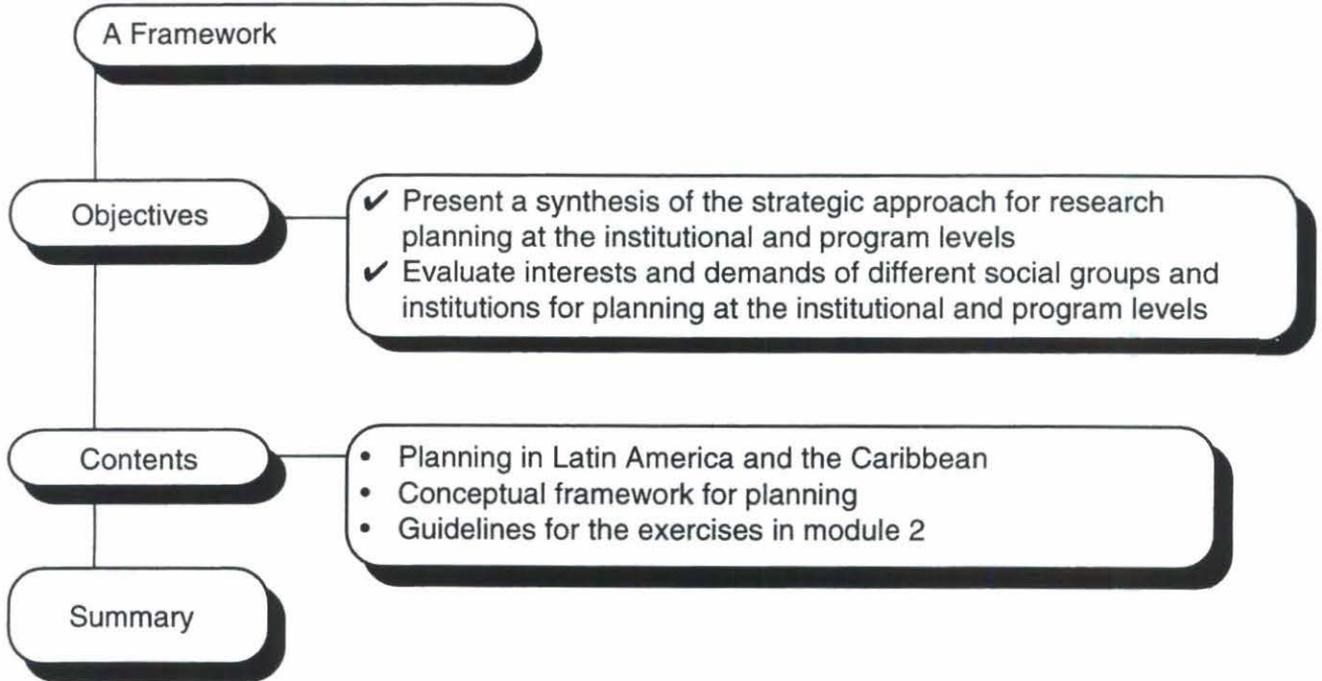


Figure 1. General logic of the manual

Sequence 1. A Framework

	Page
Flowchart for Sequence 1	8
Introduction	8
Planning in Latin America and the Caribbean	9
• Global changes, institutional sustainability, planning, and the future of agricultural research in LA&C	9
• Planning in the agricultural research institutions in LA&C	10
Conceptual Framework for Planning	10
• Definition, philosophy, principles, and aspects of planning	10
• The strategic approach to planning	12
• Planning types and products	13
• Decentralization from national to regional levels	13
• The political dimension of planning	15
• The research institution as a production system	15
Summary	16

Flowchart for Sequence 1



Introduction

The world is rapidly changing, and these changes will affect most countries to some extent, countries in Latin America and the Caribbean included. The creation of regional economic blocs, the trend to favor sustainable development models, the biorevolution, and the growing interdependence of economies, among other changes, will have many implications for our societies and their institutions, including those dedicated to agricultural research.

The analysis of agricultural research institutions in Latin America and the Caribbean reveals the need to incorporate the strategic planning approach into their management practices.

The first part of Sequence 1 describes the situation of planning in the region. It (a) relates the global changes to institutional sustainability; (b) argues that the future of agricultural research in Latin America and the Caribbean depends on the

sustainability of its institutions; (c) holds that planning can contribute to the institutional sustainability; (d) sums up the situation of planning in these institutions, to demonstrate the need for introducing the strategic approach; and (e) presents some basic elements of the strategic approach that can be applied to planning.

The second part of Sequence 1 brings up six points related to a conceptual framework for planning. Its purpose is to (a) define planning in general; (b) synthesize the philosophy, principles, and parts of planning; (c) relate levels of management decision to the different types of planning; (d) discuss some relevant products of planning; (e) define critical roles in the planning process; and (f) present the agricultural research institution as a system that produces knowledge and technology, referring to the CIPP approach (context, inputs, processes, and products).

Planning in Latin America and the Caribbean

Global changes, institutional sustainability, planning, and the future of agricultural research in LA&C

Although the international financial crisis has affected most institutions, this is neither the only nor the most important external factor for the poor performance of most institutions, including those dedicated to agricultural research. Global changes have started a chain of crises in national development models, resulting in uncertainty, turbulence, and lack of continuity. Institutions' efficiency, efficacy, and effectiveness depend on their capacity to respond to the external environment. As the environment is changing rapidly and in different ways, the difficulty that institutions have in adjusting to the changes explains the variability of their performance.

Key requirements for institutional sustainability

- *An institutional "project"*
 - *Institutional competence*
 - *Institutional credibility*
-
-

In the transition period toward a new, yet-to-be-designed, development model, institutions need to address issues of their future sustainability. Institutional sustainability requires: (a) an institutional "project" that defines the new mission, goals, policies and institutional strategies; (b) institutional competence in conceptual, methodological, organizational, administrative, and structural areas; (c) institutional credibility, which implies greater "transparency" of management clarity, and getting more in tune with the environment. It also calls for participation of the institution's human resources, as well as real participation by clients, users, and partners. Social and political permeability is also necessary to incorporate important social themes into its programs (de Souza, 1993).

An institutions's efficiency, and effectiveness depend on its capacity to respond to the changes in the external environment

In Latin America and the Caribbean (LA&C), agriculture, forestry, and agroindustry will play a strategic role in the region's future. The agricultural research institutions will play a critical role in their development. But the future of research depends on the sustainability of the institutions. From this perspective, planning is tool to support management in its efforts to promote the needed changes to adjust to a changing environment, and hence, sustainability.

If top management can make the political decision to use planning as an instrument for building the institution's future, and if it is at the same time considered as an integrated PM&E system, then it could offer all its potential to guarantee institutional sustainability.

Planning in agricultural research institutions

The ISNAR/BID Project carried out 13 case studies to diagnose the situation of planning, monitoring, and evaluation (PM&E) in 12 countries of LA&C. The following summary is based on Novoa and Horton (1994).

The following institutions were studied: Research Branch of Agriculture Canada; the Agricultural Research Center of Washington State University-WSU-(USA); ICTA (Guatemala); INIFAP (Mexico); CONITTA (Costa Rica); CARDI (Trinidad & Tobago); SIRI (Jamaica); ICA (Colombia); CENICAFE (Colombia); CIAT (Bolivia); INIA (Chile); INTA (Argentina); and EMBRAPA (Brazil). The common elements and the differences in terms of weaknesses and strengths in planning are synthesized here.

Two types of planning are done in these organizations: institutional planning and research planning. In the first, institutional development is the goal; in the second, planning seeks to establish strategies, goals, and priorities for research. It also defines the schedule for activities and results.

All the institutions plan, or carry out planning-related activities. Among institutions, there are differences as to the types of planning done. For example, some organizations have experience in long-term institutional planning (EMBRAPA, ICA, INTA, CARDI, CIAT). Others have focussed their efforts on regional planning (INTA, INIFAP, CANADA,

WSU). Only EMBRAPA has established a complete process of strategic planning for the institution and for research.

Since participatory and strategic planning are fairly new, little experience exists on their application. Some institutions have begun planning exercises with elements of the strategic approach—or have stated that they are interested in doing so (CENICAFE, CIAT, INTA, INIA, ICA, INIFAP). On the other hand, planning is more centered on research than on institutional development in institutions where research is focused on one basic crop (CENICAFE, CARDI, CIAT, SIRI).

In the relatively small institutions, the planning process has five characteristics.

- It tends to be participatory and decentralized.
- It favors research planning rather than institutional planning.
- It emphasizes regional needs and specific products.
- It is based on budget allocations (ICTA, CIAT).
- The planning process is less rigorous, systematic, and formal than in bigger institutions.

The following were constraints to planning in the region's institutions:

- insufficient personnel qualified to design and elaborate plans (CIAT, CONITTA, ICTA);
- excess of immediate demands by external groups related to funding requests (ICA, CIAT);
- high cost of complex exercises for strategic planning (EMBRAPA);
- lack of institutionalization of planning;
- frequent changes in the political environment that interrupt the continuity of plans;
- long time span and uncertainty of research activities and results, which make planning difficult; and
- lack of understanding by some donors who force institutions to focus their efforts on the donors' immediate problems.

Weaknesses of planning were identified:

- difficulty in exploring the environment and defining the content of research plans;
- difficulty in involving clients and users in setting research priorities; and
- inability to anticipate changes in the socioeconomic environment of the institutions.

Strengths in planning included:

- strategic planning (EMBRAPA, ICA);
- management information systems (INTA, ICA, EMBRAPA);
- research information systems (ICA, INTA, CANADA, WSU);
- diagnosis and priority setting by production systems (ICTA);
- interpretation of research planning policies (EMBRAPA, ICA);
- decentralization (ICA, INTA);
- participation of clients and users (CENICAFE, ICTA, CANADA, WSU); and
- integration with other institutions (CARDI, CANADA, WSU).

Benefits of planning in LA&C

- *Obtaining financial resources*
 - *Facilitating political-institutional negotiation*
 - *Strengthening the decision-making process*
-
-

Finally, it can be argued that in the region, planning has contributed to (a) obtaining financial resources; (b) negotiating political-institutional decisions with funding and development institutions; and (c) strengthening the decision-making process and improving the overall managerial performance of institutions.

Conceptual Framework for Planning

Definition, philosophy, principles, and aspects of planning

Planning has become an important tool, as much for government as for research organizations. Planning allows people to organize resources and activities to achieve previously defined objectives and to stay in tune with the needs and demands of the environment.

The modern vision of planning is a mix of philosophical, technical, social, economic, and political concepts. There are different methods and techniques, based on statistical projections, estimations, and assessments, to look into the future, in terms of objectives, goals, policies, and programs. Although there are many different definitions of planning, most include several of these six features:

Six Characteristics of Planning

1. *Rationality in the selection of options.*
 2. *Coherence in the formulation of objectives.*
 3. *Congruence among objectives, resources, and policies.*
 4. *Strategies for reaching the objectives.*
 5. *Outline of the preferred future.*
 6. *Elements for the political viability of the plan.*
-
-

For the case of agricultural research, planning is understood as a process to rationally combine organizational resources to allow an institution, center, program, or project to achieve certain objectives in a specific context or environment. Planning has become a whole new “science” with applications for practically any human activity. Some common philosophical concepts of planning are described by Oliveira (1992):

- **Minimum-satisfaction philosophy.** This philosophy views planning as a tool to obtain the minimum satisfaction acceptable to the institution and its environment. Only organizations guided by a “logic of survival” opt for this philosophy, which doesn’t allow them to take advantage of many opportunities which present themselves.
- **Adaptation philosophy.** This philosophy seeks to produce the changes needed to adjust an institution to its changing environment, especially in times of significant and rapid external changes. The emphasis is on the processes rather than on the products of planning. It assumes that a change process should train, motivate, and integrate human talents of the organization at all levels.
- **Optimization philosophy.** This philosophy optimizes the decision-making process by using quantitative models. This approach began with the development of high-capacity computers. The main problem with this philosophy is that it doesn’t allow for qualitative variables or judgments thus disregarding the intuition and creativity necessary to visualize and interpret oncoming trends.

The authors of this module believe that the most appropriate philosophy for planning is one which responds to the needs of the organization at a given moment and in a given political-institutional context. They do not recommend to adhere to one specific planning philosophy.

Agricultural research institutions will usually want to adopt a planning philosophy with the following characteristics:

- flexibility to allow innovation and adaptation;
- being in tune with the environment;
- long-term commitment;
- participation of institution’s human resources;
- multiple approaches;
- decentralization of processes;
- consistency with the prevailing management model; and
- congruence and integration of planning activities with monitoring and evaluation.

Planning is carried out according to certain general and specific principles. According to Oliveira (1992), general planning principles include:

- **Objectives.** The objectives should be organized in a hierarchical order.
- **Planning.** Planning should precede the other activities, considering its potential for organizing and directing a course of action to the attainment of objectives.
- **Transformation potential.** This principle recognizes the potential of planning to support the transformation of most other activities.
- **Efficiency and effectiveness.** This assumes that planning must seek to maximize the relevance of activities and the value of results in relation to invested resources.

According to the same author, more specific planning principles are:

- **Participation.** This is a characteristic of strategic planning. Participation emphasizes the importance of the process over the product. Training, education, and motivation achieved in a participatory planning process can eventually become more important than the plan, program, or project itself.
- **Coordination.** This principle recognizes the interdependence of institutional components and the activities.
- **Vertical and horizontal integration.** This emphasizes the need to integrate both the different administrative units and the different management levels.
- **Continuity.** This principle points out the long-term commitment of planning to the sustainability of the organization’s activities.

Planning is a complex process that involves several organizational components. Oliveira (1992) divides planning into five types, according to the focus of the activity. Planning can relate to:

- the ends
- the means
- the organization
- the resources
- implementation and control

The strategic approach to planning

“Strategic management” does not replace “traditional management.” On the contrary, the strategic approach strengthens and modernizes existing management by providing a new direction to its tactical and operational dimensions.

In the past the concept of strategy was associated with military activities. In the 1960s, the term was incorporated into the language of business. In the 1970s, the strategic approach was introduced into management science. The first to use the term “strategic management,” was H. Igor Ansoff, of the University of San Diego, USA. Planning, according to the strategic approach, includes the vision, the concepts, and the methodology necessary to handle the complexity and the changing dynamics of the environment.

A more comprehensive vision of the strategic approach applied to planning can be found, in Pfeiffer *et al.* (1985), David (1988), Rue and Holland (1989), Oliveira (1992), and Certo and Peter (1993). When applied to planning, the strategic approach directs managers’ attention to:

- Analysis of their organization’s external environment, to identify opportunities and threats.
- The importance of a system centered on the needs of clients, users, and partners. For research institutions, this means analyzing the situation of the users, their need for new technology, and their ability to adopt it, as a base for formulating research objectives.
- Internal analysis of the organization, to identify its strengths and weaknesses.
- Gap analysis, to identify difficulties that the organization must overcome to advance towards a desired situation.
- Review and formulation of the organization mission, objectives, policies, and strategies. This implies seeking a consensus. In a strategic planning exercise, a consensus is reached on

the organization’s mission, objectives, priorities, and strategies. All parties involved should participate in the search for consensus, both within the institution (top management, middle management, and researchers), as well as its clients, users, beneficiaries, and partners. This consensus is very important to obtain the political support and the necessary resources and commitment to put the plan into action.

- The need for long-term commitment.
- The challenges posed by a socially, economically, politically, and technologically complex environment.
- The need to mobilize intelligence and creativity to promote continuous change.
- “Intelligent investments,” in for example training and development of human resources within the organization.
- The construction of a “strategic culture” able to adapt to rapidly changing conditions.
- Interdisciplinary approaches and multidimensional perspectives for dealing with the complexity of the environment.
- Mechanisms to allow clients, users, and partners of agricultural research to participate in defining and assessing policies and priorities.
- Participatory management models and processes.

The strategic approach to planning has great potential to improve the planning of agricultural research. Research institutions produce knowledge, information, and technologies, which often have a relatively limited market demand. They are “**public goods**” which have great value for society but which cannot be patented or sold.

Strategic planning in agricultural research emphasizes the diagnosis of the environment and the clear identification of the needs of clients, beneficiaries, and users. It seeks consensus in the **characterization of the demand**, and therefore in what will be the **institutional products**, to ensure that these products are actually required by users.

Strategic planning emphasizes the need to identify changes in the environment, not just in terms of the current situation, but also with special interest in the longer term. This is of particular significance for research institutions, because their activities, must always try to be on the **frontiers of knowledge** and oriented toward future needs.

In the field of agricultural research, change is frequent and rapid. Innovation may affect many

production sectors. If institutions, particularly those in developing countries, do not take part in this rapid process of innovation, they will produce obsolete technologies and lose credibility and importance in society. Strategic planning can help institutions adapt to changes, prepare for the future and improve their sustainability and overall competence.

Planning types and products

A common problem in the discussion about types of planning is the supposed dichotomy between short-and-long term planning, as if there were an irreconcilable difference between them. On the contrary, planning for the short, medium and long term should be interdependent. The vision of the future in the strategic, long term plan can only become reality if the tactical plans for the medium term are derived from it, and the operational plans for the short term are derived from the tactical plans. The future is built on the consistency between the operational plans, derived from the tactical plans, which, in turn are obtained from the strategic plan.

“The future is built upon operational plans appropriately derived from tactical plans, which, in turn, are adequately derived from the strategic plan. The consistency between the three types of plans is the base for the construction of the future”

The types and products of planning are directly associated decision-making levels (Oliveira, 1992). Every institution has three basic decision-making levels: (a) top management -the strategic level, (b) middle management -the tactical level, and (c) the operational level. Table 1 shows the associated types of planning.

Planning, in the broadest sense of the word, occurs at all levels. For example, researchers carry out project planning, and heads of experimental stations do operational and tactical planning. Therefore, even though the leadership for strategic planning is at the level of top management, in principle all levels should participate in a top-to-bottom and bottom-to-top process .

These are the levels at which planning occurs in agricultural research in most countries:

- **System level.** The “system” refers to all organizations that carry out research in a country
- **Institutional level.** The “institution” is an agricultural research entity.
- **Program level.** The “program” is a set of projects and activities of agricultural research, made up of a series of subprograms, projects and activities oriented to the achievement of the program’s objectives
- **Center level.** The “center” corresponds to a national or regional entity or to an experimental station, which is part of an agricultural research institution.
- **Project level.** The “project” is a set of interrelated activities with a common purpose.
- **Activity level.** The “activity” is the basic research unit. An experiment that forms part of a project is an example.
- **Researcher level.** The “researcher” is the individual responsible for research activities.

Decentralization from national to regional levels

The institutional structure of agricultural research in Latin America is in a process of transformation. In the past, centralized organizations predominated, in which the national institutes were responsible for planning and carrying out all research. The planning unit was usually the national program for an animal or plant species (e.g. the national rice program).

The national program dictated the operational policies to the regional offices, such as the regional research centers and experimental stations.

Today, however, modernization of governments is characterized by decentralization, and is opening the path to regional planning, which is usually assigned to the regional research center.

This new structure poses a question: To what extent can planning be carried out in the central offices of the national institutes without limiting the autonomy of the regional centers? The answer becomes even more complex when other actors, such as the private sector and universities, enter into the scene.

Table 1. Decision-making levels and types of planning

Decision-making level	Type of planning	Characteristics
Top management <ul style="list-style-type: none"> • strategic level • strategic decisions 	Strategic planning	<ul style="list-style-type: none"> • Diagnostic and prognostic process that considers the institution as a whole, as an opensystem, and in relation to its environment • Long-term objectives, goals, policies, priorities, and strategies (10-15 years), which guide the tactical planning • More comprehensive, with greater risks and less flexibility than tactical and operational planning.
Middle management <ul style="list-style-type: none"> • tactical level • tactical decisions 	Tactical planning	<ul style="list-style-type: none"> • Organizational process that considers the subsystems of the institute • Medium-term objectives, goals, policies, priorities, and strategies (3-5 years), derived from the strategic plan, and oriented to the operational planning • More comprehensive, with greater risks and less flexibility than operational planning.
Operations <ul style="list-style-type: none"> • operational level • operational decisions 	Operational planning	<ul style="list-style-type: none"> • Practical process, that considers the individual activities of each subsystem of the institution • Short-term objectives, goals, policies, priorities, and strategies (1 year), derived from the tactical plan, to be implemented • Not as comprehensive, less risks and greater flexibility than strategic and tactical planning

These questions do not have definite answers, because the field of action of each of the players has not yet been defined. However, as a working

hypothesis, the following framework can be suggested:

Authority	Level of planning	Instruments and/or environments
National System	<ul style="list-style-type: none"> • Global policies • National strategy 	<ul style="list-style-type: none"> • Market trends • Scientific and technological trends
National Institute	<ul style="list-style-type: none"> • Broad strategic areas 	<ul style="list-style-type: none"> • National budget • Macro policies • Sectorial policies
Regional Centers	<ul style="list-style-type: none"> • Specific areas 	<ul style="list-style-type: none"> • Programs • Projects

Agricultural research planning at the national system level should include analyses of major international trends in the market (demand) and in science and technology (supply). The strategic research areas in which the country has a relative advantage can be converted into a comparative advantage through the development of human resources. There should be a clear relationship between macro and sectoral policies.

The national institute would be responsible for planning the broad strategic areas, to formulate norms on distributing financial resources, on regional priorities, on training, and on infrastructure investment. For example, if the national system has identified organic agriculture as a priority for exports, the national institute should identify the strategic areas for implementing this type of agriculture, such as biological control of pests and plant diseases.

The regional centers should carry out operational planning by designing appropriate programs and projects. An example would be an entomology program with projects for identifying and solving specific pest problems.

The political dimension of planning

Although planning potentially strengthens the management of agricultural research institutions, without the political-institutional support of top and middle management, the activity becomes sterile.

An integrated system of PM&E works as a kind of “circulatory system” for strategic information, feeding the management of decision-making at all levels. On the long run, one of the most revealing indicators of the success of PM&E is the degree to which top management has supported it. Only when top management is conscious and convinced of the critical importance of PM&E can it offer all its potential to institutional sustainability and competition.

An integrated system of PM&E works as a kind of “circulatory system” for management information, feeding decision making at all levels

The argument in favor of an integrated system of PM&E goes beyond simple political support. Since this sequence tries to demonstrate the need to

introduce the strategic approach to planning, the argument is that it requires the formulation of a “strategic intention” (de Souza, 1993).

Components of a “strategic intention” in planning

- *Future vision*
 - *Confidence of its usefulness*
 - *Political support*
 - *Political decision*
 - *Political courage*
-
-

The “strategic intention” is a combination of (a) a “vision” of the future for planning oriented by the strategic approach; (b) the “confidence” that the strategic approach applied to planning will strengthen management; (c) the “political will” to transform the vision into reality; (d) the “political decision” to put the strategic approach to planning into practice and; (e) the “political courage” to face inevitable risks.

The strategic approach in planning *per se* does not work miracles. It is necessary that top and middle management are convinced of its potential. This means that the strategic approach has two dimensions, an instrumental and a behavioral one. The instrumental dimension includes conceptual and methodological elements and instruments. The behavioral dimension is essential for building the “strategic intention” necessary for success.

The research institution as a production system

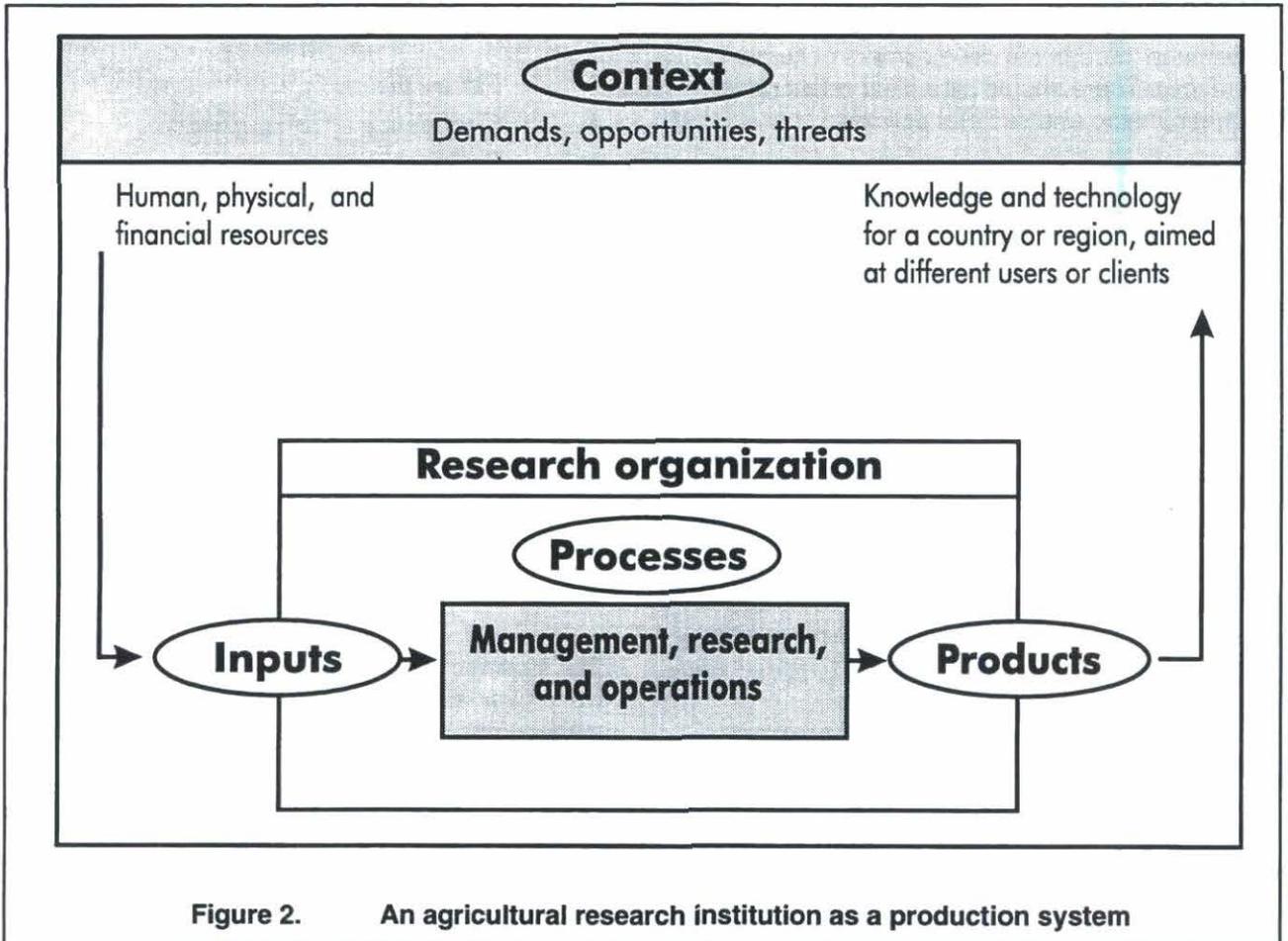
Any system can be seen as a production system. The CIPP model, developed in the USA for evaluating educational programs can be used to analyze agricultural research systems.

CIPP refers to evaluation of the: **C**ontext, **I**nputs, **P**rocesses, and **P**roducts. Using the CIPP model, an institution can be analyzed this way:

- The institution exists within a “**context**” (relevant environment) with its needs, opportunities, and threats.
- It needs certain “**inputs**” (different types of production, management, or financial resources) to carry out its activities.
- It develops and carries out certain “**processes**” (research and other activities)

- It offers certain “**products**” (information, technology) to beneficiaries or users.

From this perspective, an agricultural research institute can be visualized as a knowledge and technology production system, as shown in Figure 2.



Summary

This Sequence introduced the relationship between global changes, institutional sustainability, planning and the future of agricultural research in Latin America and the Caribbean. The main argument is that these changes are causing a crisis in the development models, and, consequently, create an atmosphere of turbulence and uncertainty for agricultural research institutions.

To face the new realities, and ensure institutional sustainability, it was argued that action is needed. Arguments were presented in favor of strategic planning as a management tool to support sustainability. A summary was presented of the situation of planning in Latin America and the Caribbean, based on 13 case studies.

Finally, arguments were given in favor of the strategic approach in planning. The presentation of strategic planning in this part is kept short because in Sequences 2 and 3, the approach is discussed in detail.

In the second part of this Sequence, planning is seen as a process to rationally combine the structure, resources and organizational aspects, so that an institution or program can achieve certain goals and objectives. The different philosophies, principles, types, and products of planning were presented.

The characterization of the different types of planning in relation to the different decision-making levels of an organization was emphasized. The Sequence continued with an explanation of the

importance of the political dimension of planning, and the “strategic intention” of top management. The existence or absence of this factor can mean success or failure to institutional change, because of lack of vision, conviction, will, decision, or political courage.

The Sequence concluded by suggesting that agricultural research institutions be seen as systems for the production of knowledge and technologies. The institutions exist within a context (external environment), need and use inputs (human resources, financial resources, etc.), develop processes (management, organizational,

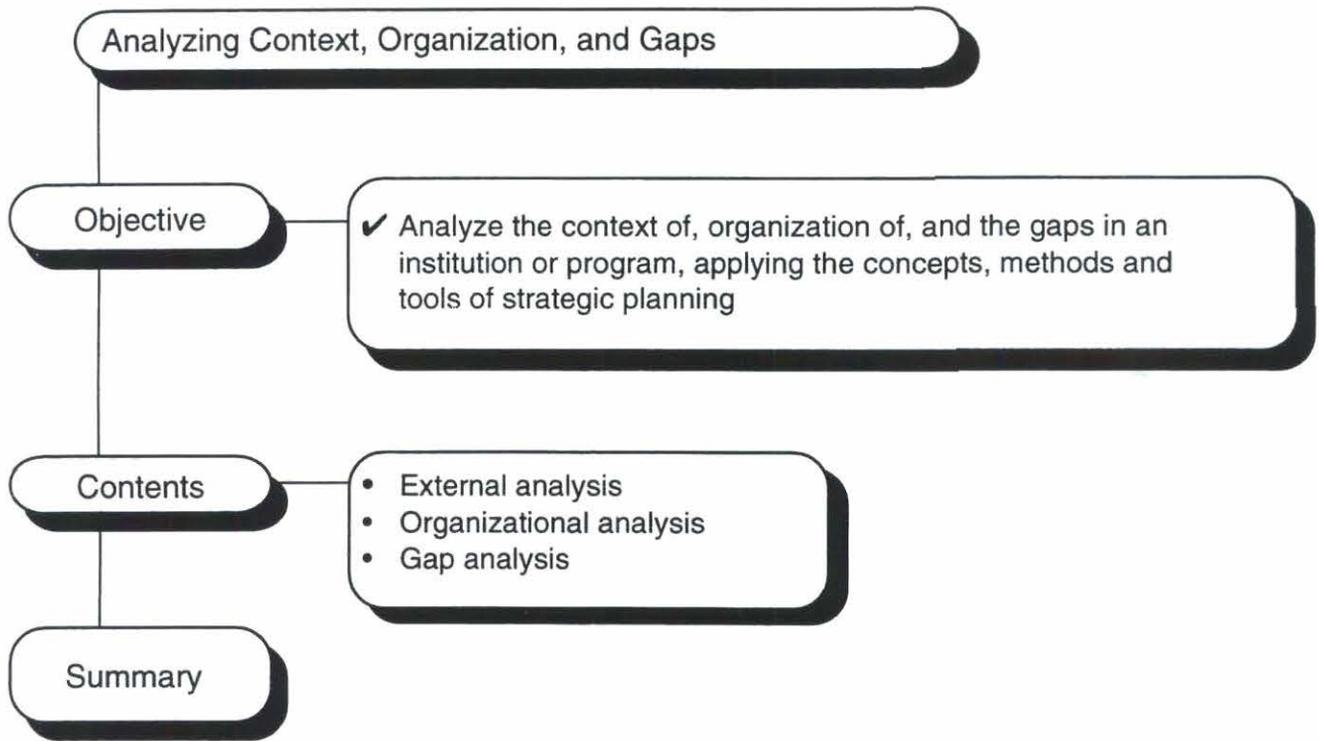
etc.), and provide products and services to satisfy the demands and needs of the context. This image of the organization as a system follows the approach offered by the CIPP model (context, inputs, processes, products).

The Sequence closed with a simulation exercise. The results shall be used in exercises of Sequences 2 and 3. A hypothetical NARI holds a meeting with representatives of stakeholders. The representatives present their demands and discuss and explain the difficulties and possibilities for their meeting these needs.

Sequence 2. Analyzing Context, Organization, and Gaps

	Page
Flowchart for Sequence 2	20
Introduction	20
External Analysis	21
• Conceptualization	21
• Methodologies for external analysis	21
Organizational Analysis	28
• Relevant organizational inputs	28
• Relevant organizational processes	29
• Products	29
• Gathering, processing and presenting the information	30
• Strengths	30
• Weaknesses	30
Gap Analysis	33
• Definition of gaps	33
• Identification of gaps	33
• Criteria of hierarchy	34
Summary	37

Flowchart for Sequence 2



Introduction

Global changes affect societies and their institutions. Institutional change requires that the most relevant internal and external dimensions of an organization be analyzed. Only by comparing the results of these analyses can the gaps be identified that the institution will have to bridge to adjust to its changing environment.

The external environment of the institution offers important reference points for guiding institutional change. In the external environment, an institution finds its greatest reason for existing: its clients, users, beneficiaries, partners and competitors; and the forces that form *social*, economic, political, technological, and institutional *trends*. All this implies the emergence of new realities and situations that bring about new demands, challenges, risks, and uncertainties, and new opportunities and threats to the institution. Therefore, institutional change **should** start with an analysis of the external environment that affects the institution.

The internal environment of an institution is also important. The performance of the organization should be evaluated with the external environment as a reference point. In this respect, no matter what the object of analysis (inputs, processes or products), it is necessary to go beyond the organization itself, and look to the institution's products and services, and the problems, needs, and challenges of its external environment. The outputs of the organization should also be judged in relation to how they satisfy external requirements.

The prospective analysis of an institution's environment is an input for its organizational analysis. External analysis permits an organization to anticipate trends and events. This can guide decision making and planning, and facilitate adjustments to opportunities and threats from the environment. Also, by comparing the two analyses, internal gaps can be identified that must be overcome to achieve sustainability.

Sequence 2 provides strategic planning concepts, methods and tools for carrying out environmental analysis, organizational analysis and gap analysis.

While the presentation refers to research institutions and programs, these elements and tools can be adapted for use on other levels, such as research centers, experiment stations, or projects.

External Analysis

The future doesn't exist; it is constructed by society and its institutions (de Souza, 1993). For example, once a "strategic intention" has been formulated, an institution builds its future by implementing short-, medium-, and long-term policies and strategies. The definition of policies, strategies, and actions requires an intensive and organized effort, using information, creativity, and long-term commitment. This stems from the prospective analysis of the external environment (David, 1988; Rue and Holland, 1989; Sastoque, 1991; Oliveira, 1992; and Certo and Peter, 1993).

Conceptualization

A prospective analysis is not a magic set of tools for fortune-telling. The prospective analysis tries to identify the "probable future" in order to build a "desired future". There isn't just one future, but rather a multitude of possible futures, none of which is guaranteed. The analysis is less for making predictions than for understanding the changing nature of the environment, on the basis of which an institution will have to build its future. It serves to identify trends to guide policy formulation, and to design effective strategies (de Souza, 1993).

Prospective analysis of the external environment involves monitoring, interpreting, and evaluating the relevant external environment. These permit identification of present and potential opportunities and threats that can influence the institution's ability to achieve its objectives (Certo and Peter, 1993).

Although identifying these factors does not guarantee success, the analysis allows the institution to be an active protagonist in building its own future, as well as reducing risks and uncertainty in the process. For this reason, at the institutional level, top management is the principal client of prospective context analysis.

External analysis should be carried out within the existing integrated PM&E system of the institution. The institution will need to make the necessary changes if the PM&E system is not functioning as an integrated and flexible system, to permit it to operate at all levels of management.

External analysis has several purposes and functions (Oliveira, 1992; Certo and Peter, 1993). The following are examples of purposes:

- To study the relationships between the institution and its environment in terms of present and potential opportunities and threats that will affect its performance and relative position.
- To provide top management with the capacity to respond to critical questions from the external environment.
- To explore future conditions of the institution's external environment, to include them in the decision-making process.
- To identify emerging problems that may be relevant to the institution, determine which will become priorities, and design the strategies to handle each one.
- To build a vision of the future for the institution, based on signs given by the emerging realities in the environment, which in turn reveal the forces that will shape the future.

The following are examples of the functions of an external analysis:

- **The policy-oriented function**, of the analysis keeps top management informed of the trends that affect its present institutional policies and/or technologies. This is only of secondary interest to middle management.
- **In the specific theme-oriented function**, the analysis is carried out in a selective and restricted way for a particular objective. It may be directed to one special aspect of a center, institution, program, or project. Its interest would be limited to those directly involved with that theme or area.
- **The PM&E-oriented function**, mainly actualizes and strengthens the integrated system of PM&E, and therefore the management process of an institution, center, program, or project. This is the most complete form of context analysis, and of it is interest to all the groups of an institution, a center, program, or project.

To fulfill these and other purposes and functions, external analysis requires a combination of methods and techniques to capture the complex, multidimensional reality of the institution's external environment.

Methodologies for external analysis

Ideally, prospective studies should evolve from a "predictive mode," i.e. one that tends to occur, to the "exploratory mode," i.e. one that can occur, to

the “normative mode,” i.e. one that must occur the desired situation (de Souza, 1993). Since prospective studies that cover all these “modes” are costly, most institutions adapt methods to carry out the analysis at lower cost.

There are several techniques for carrying out the external analysis, including qualitative techniques like brainstorming, pooling of experts judgements, Delphi techniques and building scenarios.

The most frequently used quantitative techniques are the “structural analysis,” “the cross-impact matrix,” “dynamic models,” “risk forecasting,” and “trend extrapolation” (David, 1988, and Sastoque, 1991). Different authors and institutions have used different approaches for prospective analysis of the external environment (Rue and Holland, 1989; Oliveira, 1992; and Certo and Peter, 1993). There is no universal methodology, since institutions differ in size, nature of activities, internal organization, philosophy, and management models.

The approach presented here assumes a shortage of funds —a reality for most of the agricultural research institutions in Latin America and the Caribbean. The combination of concepts and methods and tools is designed to allow any institution or program to carry out analyses without having to make large investments or call the help of experts.

Before developing the methodology, the following key terms must be defined:

“Relevant external environment.” Every institute or program is part of a general external environment and an operational external environment. The **“general external environment”** is the macro-environment that affects an institution, no matter what sort of research is done. At this level, events are beyond the control of the institution. The socio-cultural, political, economic, and technological changes occurring worldwide are examples. The **“operational external environment”** is the environment in which, and for which, the institution develops its activities. It directly influences the institution.

The relevant external environment is made up of many actors: present and potential clients, users, partners and competitors, (regional, national, or

international). Every institution or program shares the same “general external environment,” but each one is influenced by a different “operational external environment.” They may share certain elements, but they will never be identical. Although the operational environment is beyond the direct control of an institution, it has a greater possibility here of exercising some control than in other aspects of the environment.

The **relevant external environment** corresponds to the combination of elements (forces, aspects, events, facts, and actors) of the general and operational environments that has the greatest potential for directly affecting the present or future activities of the institution. The general and operational environments are multi-dimensional: the principal dimensions are socio-cultural, economic, political, legal, and technological.

“Critical external factor.” Any element (force, event, fact, or actor) that can directly affect the institution’s general performance or the performance of some of its activities. This is a “critical factor” to be considered in the external analysis.

“Opportunity.” An opportunity is any element or circumstance that, although not under the direct control of the institution, can contribute to any of its most important activities. In this sense, any element from the external environment that can somehow benefit the institution should be considered an opportunity. Opportunities must be known to be exploited strategically.

“Threat.” A threat is any element that can become a disadvantage/risk/danger for the performance of any of the institution’s most important activities. Any element (force, event, fact, or actor) of the relevant external environment that can partially or totally interfere with the institution’s general performance, or that of any of its activities, should be seen as a threat. Threats must be known to be avoided or to reduce their impact.

The methodology for prospective external analysis is made up of a “strategic diagnosis” in three steps and a “strategic prognosis” in two steps, see Table 2.

Table 2. Steps for the Prospective External Analysis

Strategic diagnosis	Strategic prognosis
1. Identify the relevant external environment: the general and operational external environments	4. Identify the trend for each critical factor chosen
2. Identify the critical external factors in hierarchical order	5. Identify and evaluate opportunities and threats from the trend for each critical factor
3. Identify key sources of information for each critical factor	

The following are suggestions for carrying out each of the steps of the external analysis of an institution or program.

The coordination group and the external consultants

Before formulating a strategic plan for a program or institution, top management should appoint an interdisciplinary coordinating committee. This requires the political will to support the committee financially, politically, logistically, and technically. Financially, the committee needs enough funds to carry out the whole process. Politically, it must be able to count on direct participation from top management at all times. Logistically, it must have all the materials, instruments, and basic equipment (such as computers, software, etc.) and the necessary personnel (secretaries, assistants, etc.) to assure the completion of the job. Technically, the committee should be able to use external consultants (experts in management and strategic planning) when necessary. If called upon, the consultants should not do the work for the group, but train them so they will be able to form their own plans independently. External consultants are also helpful for guiding and giving support in critical moments of the process.

Steps for strategic diagnosis

Step 1: Identify the relevant external environment. In the socio-cultural dimension, the coordinating committee should identify the social aspects, indicators, and variables that best characterize the society, country, and/or region of the institution or program. The group should concentrate on the aspects most strongly related with the institute's direct activities.

In the general **economic dimension**, the coordinating committee should identify (a) patterns

of availability, distribution, and use of the financial resources in the general external environment; (b) national economic, fiscal, and monetary policies of the economic blocs and the more developed countries of interest to the program; (c) internal and international marketing trends for inputs and products, natural or processed; (d) consumption patterns of the internal and external market; (e) inflation, interest, and tax rates; (f) government budget deficits; (g) key factors of importation and exportation; and (h) the key values, principles, and premises that are affecting or will make up the "international paradigm" and the "national development model". The institute must discuss and select the most important economic aspects to be considered for its particular case.

In the **political dimension**, the coordinating committee must consider the political elements and aspects that can support or limit the general performance or any of the most important activities of the institution: relevant rules and policies, as well as political-ideological trends of the federal and/or state (provincial, departmental) and/or municipal government (conservative, progressive, etc.).

In the **legal dimension**, the coordinating committee should consider the laws and legislation that affect (a) agroindustry, especially farming, livestock, fishing, and forestry; (b) development of science and technology in general; and (c) the development of agricultural research in particular.

In the **technological dimension**, the coordinating committee should consider (a) the technological forces that drive the agroindustrial development; (b) the enhancing and limiting factors for national technological development; and (c) the technological paradigms that are emerging in the country and in the world.

The external environment should be analyzed in terms of the most relevant actors: regional, national, and international clients, users, partners and competitors, whether present or potential

The “operational external environment” must be analyzed primarily in terms of the most relevant actors: regional, national, and international clients, users, partners and competitors, present and potential. The committee should ask critical questions such as: Who are they? How many are there? Where are they? What do they do/produce? What do they need? What are their major problems or challenges? In what productive chain and what technological level are they? How are they

positioned? How are they organized and represented? What are the markets for their interests? What are their present and future expectations? etc.

In the characterization of the relevant external environment for an institution or program, three factors are equally important: (a) the public, private, and non-governmental segments; (b) the “eco-regional” approach at any government level; and (c) the division and interdependence of the public powers at the federal, state (departmental or provincial), and municipal levels.

Table 3 shows a chart for recording the main elements that characterize the relevant external environment of an institution or program.

Table 3. Chart for recording the main characteristics of the relevant external environment

Main dimensions of the relevant external environment	Critical factors of the external environment
General external environment	
• socio-cultural dimension	
• economic dimension	
• political dimension	
• legal dimension	
• technological dimension	
Operational external environment	
• clients	
• users	
• partners	
• competitors	

Step 2: Define the order of importance of critical external factors: In Step 1, the coordinating committee can identify most of the factors that make up the “relevant external environment” of the institution. In Step 2, the group must concentrate on which of the factors identified in Step 1 should be chosen as critically important in the general performance of the institute. No matter what factors are chosen in Step 1, and Step 2 the committee must make consecutive selection exercises until the final list contains no more than 20 critical external factors. Table 4 facilitates the recording of the most of the critical factors (in order of importance).

Step 3: Choose the key sources of information. In Step 3, the coordinating committee should identify and select the key sources of information for each of the critical external factors selected in Step 2. The sources can be, for example, periodicals; documents, government plans, programs and projects; recent books that analyze or synthesize for diagnosis or prognosis; events such as conferences and seminars; experts/specialists/managers/business people; and academic, political, and social leaders.

Table 4. Chart for recording the external critical factors chosen in order of importance

Critical external factors (in order of importance)	Explanation/justification
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	

Consultating these sources should have three key objectives: (a) confirm the relevance of each external factor; (b) explore the trend of each external factor; and (c) explore whether the combination of each factor and its respective trend translates into an opportunity or a threat for the

institution. The committee should divide the work, so that each member can carry out consultations individually. Table 5 helps committee members to record the key sources of information for each critical external factor.

Table 5. Char for recording the key sources of information for the critical factors

Critical external factors	Key sources/information
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	

Step 4: Identify and evaluate the trends of the critical external factors. After consulting the most relevant sources of information for each external critical factor chosen in Step 2, the coordinating committee should make a systematic, collective effort to identify and evaluate the trends of each of the factors. The group should (a) identify the trends; and (b) evaluate whether its effects/impacts will begin at short, medium, or long term.

Table 6 facilitates recording the most relevant trends. In the first column, the critical factors are recorded in order of the importance defined in Step 2. In the second column, the trends corresponding to these factors are recorded. The three columns on the right, check under S (S=short term), M (M=medium term), or L (L=long term) to indicate when the trend will begin to affect. This helps to evaluate the relative importance of the trends.

Table 6. Chart for recording the trends for the critical external factors

Critical external factors	Trends	S	M	L
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

Step 5: Identify and evaluate opportunities and threats. From these trends, the coordinating committee can identify and evaluate the opportunities or threats represented by each trend.

Each trend can represent more than one opportunity or threat, so these should be listed in order of importance according to the potential degree of real or potential impact (low, medium, or high).

To fill out Table 7, list the critical factors, in order of importance, in the first column, and their corresponding trends in the second column. In the third and fourth columns, write LI (low impact), MI (medium impact), or HI (high impact) in the column of opportunity or threat. (Impact here refers to the effect of each external trend on the organization or program in question.)

Table 7. Chart for recording opportunities and threats represented by the trends of the critical factors

Critical factors	Trends	Opportunities	Threats
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

This will help evaluate the relative importance of the opportunities and threats, considering that those of high impact deserve more attention than those of low impact. This chart is very important for the later "gap analysis," when the committee needs to compare the opportunities and threats of the relevant external environment with the strengths and weaknesses of the institution.

After carrying out these five steps for the external analysis (Figure 3), the committee is ready to carry out the "organizational analysis," where the internal strengths and weaknesses of the institution, or program should be identified and evaluated mainly in relation to the opportunities and threats identified in the relative external environment. Finally, the comparison of the elements just mentioned will enable to the "gap analysis."

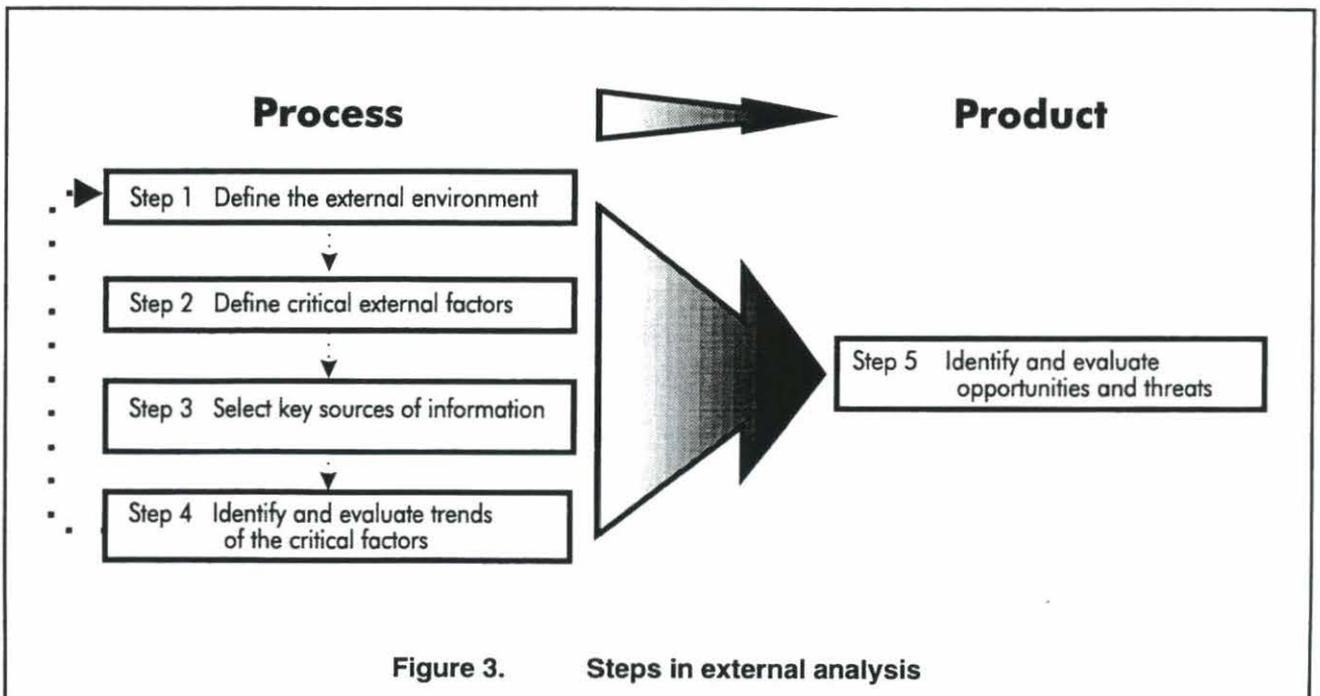


Figure 3. Steps in external analysis

Organizational Analysis

Organizational analysis is an internal assessment of the institution, to identify its strengths and weaknesses in relation to the objectives of agricultural research. This assessment should, as far as possible, be analytical, for example, by comparing the institution with others. In Latin America, with the emergence of new public and private agricultural research institutions, this exercise acquires great relevance within the context of the strategic approach to planning.

The preceding section identify possible threats and opportunities from an analysis of the external environment. Through an appropriate organizational analysis, the institution should be able to identify its position with its clients. For example, after an internal analysis, a national research institution might find that its most important clients are small, landless farmers, or, conversely, commercial producers.

The methodology for organizational analysis involves a sequence of steps summarized in the following list.

Methodology for organizational analysis

1. *Identify the aspects to be analyzed.*
 2. *Define the information needed.*
 3. *Decide who will gather the information.*
 4. *Determine how the information will be gathered and processed.*
 5. *Plan how to present the results and conclusions.*
-
-

Agricultural research institutions are knowledge-producing organisms organizations. The most relevant aspects to analyze are related to the inputs used and the processes carried out in management of human and financial resources, of research, and of transfer or extension of technology.

Relevant organizational inputs

All financial, physical, and human resources in used in the institution's operations, whether in management, research or technology transfer, can be defined as organizational inputs. What might be a relevant organizational input for one area may not be for another area. For example, a good

accounting system is relevant for management, and could be for research if costs are accounted for by projects.

The analysis of relevant inputs includes inputs that are currently available as well as those that are not. If the institution wants to diversify its funding sources by offering its research services to the private sector, an accounting package that permits accounting of costs by project is a relative organizational input, whether it is available or not.

The relevant organizational inputs are identified and placed in order of importance relative to the achievement of the desired objective. They can be classified in two broad groups: indispensable and complementary.

The indispensable organizational inputs are those which are essential for achieving the objectives. For example, without specialized professional equipment, it will be impossible to cultivate bacteria. It would be useful, but not essential, to have a microcomputer for processing the information. In this case, the microcomputer would be a complementary input.

It is very important to distinguish between these two kinds of inputs in the internal organizational analysis. Complementary inputs might contribute to an "ideal" situation that is out of the institution's budget range. On the other hand, these inputs can constitute a relative advantage. A microcomputer for each project may be a luxury the institution cannot afford, but sharing one computer would facilitate a rapid presentation of results, which might prove attractive to donor financing of the project.

For this reason, in the process of identifying and setting the importance of the inputs, a key factor is those who give and those who process the information. Later in this section, the possible groups of people to participate in organizational analysis will be described.

Once the organizational inputs have been identified, the next step is to assess their quality. An available input may not be of appropriate quality. This is particularly true in the case of human resources; even very experienced researchers may not be up-to-date in the application of a certain methodology.

The following lists the questions that should be answered in order to identify and set priorities for the organizational inputs.

***Key questions for analyzing
organizational inputs***

1. *What product or function is to be evaluated?*
 2. *Who can/should provide the information?*
 3. *Which are the indispensable inputs?*
 4. *Which are the complementary inputs?*
 5. *What do the complementary inputs contribute?*
 6. *What is the availability of each input?*
 7. *What is the quality of each input?*
-
-

Relevant organizational process

A relevant organizational process can be defined as an action or set of actions through which the institution transforms its inputs into outputs (for example knowledge or technology).

In the analysis of these processes, special attention should be given to decision-making in its different stages. Some critical organizational processes are discussed in the following paragraphs.

The human input, the most important input in research. For this reason, the selecting, training, and motivating of researchers should be carefully studied.

In most organizations today, resources are increasingly scarce and close attention needs to be paid to the acquisition and management of financial resources.

Quality control is the basis of the success of any service business, especially those that offer knowledge. The concept of quality in modern management has gone beyond an attractive presentation of the product. Today, aspects such as performance, concern for the environment, and cost control are also considered.

Pressing needs to improve the focus and impact of research organizations are resulting in greater emphasis on planning, monitoring and evaluation.

In the new, highly competitive world, in which monopolies are increasingly rarer, client satisfaction has gained great importance. In the organizations that generate knowledge, this has even greater meaning, because the client sometimes has no basis for identifying the product he hopes to receive.

***Examples of organizational processes in an
agricultural research institution***

1. *Choosing, training, and stimulating human resources.*
 2. *Obtaining and managing funds.*
 3. *Quality control.*
 4. *Planning, monitoring and evaluation of research activities.*
 5. *Needs assessment and responsiveness to clients.*
-
-

Then producers must guide him in his decision, perhaps even share the risk with him. The most important aspects to be included within each process should be related to supervision, execution, functioning, and possible improvement.

The following shows the key questions that should be answered during the analysis of an organizational process.

***Key questions for the analysis of an
organizational process***

1. *Who supervises the process?*
 2. *Who carries out the process?*
 3. *How well does the process work?*
 4. *How could the process be improved?*
-
-

Products

The last phase of organizational analysis is the analysis of the products generated by the institution. It is necessary to identify the different products resulting from scientific progress and from the application of technologies already tested elsewhere.

The following classification, while not exhaustive, can help identify the main categories of products resulting from agricultural research.

Example of the products of agricultural research

1. *Finished products:*
 - *seeds and improved varieties*
 - *animal breeds of specific characteristics*
 - *machinery and equipment*
 - *chemical and organic inputs*
 2. *Products related to knowledge on:*
 - *management of crops and production systems*
 - *animal management and sanitary control*
 - *natural resource management and preservation*
 3. *Intermediate products that contribute to scientific progress:*
 - *identification of sources of disease resistance*
 - *development of new methods or processes*
 - *maintenance and classification of germplasm*
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Gathering, processing, and presenting the information

To facilitate gathering the relevant information for organizational analysis, both at the "Input" and "Process" level, a committee should be formed of people with profound knowledge of the institution, and highly regarded by both peers and superiors. This committee may be called the "Institution Expert Committee." Its main function is to identify information needs for the analysis.

This committee can form a smaller subcommittee for gathering and integrating the data. It can also form another subcommittee for analyzing the information and presenting the results.

It is necessary to remember that organizational analysis is fundamentally an internal exercise in which all relevant parties should participate. A synthesis of the results must be distributed widely, so that relevant changes or additions can be discussed and suggested. The quality and effectiveness of the following steps of organizational analysis depend on the high participation in generating information and distributing analyses and results.

Strengths

Strengths refer to the characteristics of the inputs, processes, and products that allow the institution to

take advantage of the opportunities, or that protect it from threats coming from the context.

For example, it is a strength to have researchers trained in plant pathology in programs dedicated to socially important issues such as unsolved plant diseases.

This definition of strength tends to be a static concept of strengths. In reality, organizational strengths are derived mainly from decision-making at the management level, in terms of the allocation of resources. A proper allocation of internal resources allows the institution to interact most effectively with the market.

The proper allocation of funds permits the acquisition of inputs, implementing processes, and generating the products that the clients hope for. This can generate income and re-begin the cycle. An appropriate allocation of funds allows the institution to develop internal strengths that protect it from threats or let it use external opportunities.

The organizational strengths can be analyzed in terms of what the institution can do that others cannot. Organizational strengths are strengths only in comparison with the "market" and possible competitors. In terms of inputs, it may be the availability of highly specialized personnel; in terms of process, it may include the period in which a research theme is identified and the respective project is put into action. Finally, in terms of product, it would be everything with reference to quality control. In all the preceding examples, a good allocation of resources permits finding, maintaining, or building a strength.

When gathering information about the strengths of the institution, it is useful to distinguish between the strengths that support the institution, permitting it to take advantage of opportunities, and the strengths that defend the institution from threats. Similarly, it is necessary to distinguish the strengths that come from the availability of inputs, from the structure of the processes, or from the characteristics of the products (Table 8).

Weaknesses

Organizational weaknesses refer to all the characteristics of inputs, processes, and products that do not help the institution to make use of the opportunities or that do not protect it from threats coming from the external environment.

An example of a weakness would be to have a strong program for improving grain varieties, when

the country decides to open grain importation and abandon local production.

Table 8. Identification of institutional strengths in relation to the external environment

	Strengths that allow the institution to take advantage of opportunities	Strengths that protect the institution from threats
A. Inputs 1. 2. 3.		
B. Processes 1. 2. 3.		
A. Products 1. 2. 3.		

As with strengths, weaknesses must be evaluated with a dynamic concept. In the previous example, with a small investment, researchers could receive training which could create an opportunity to export grain varieties.

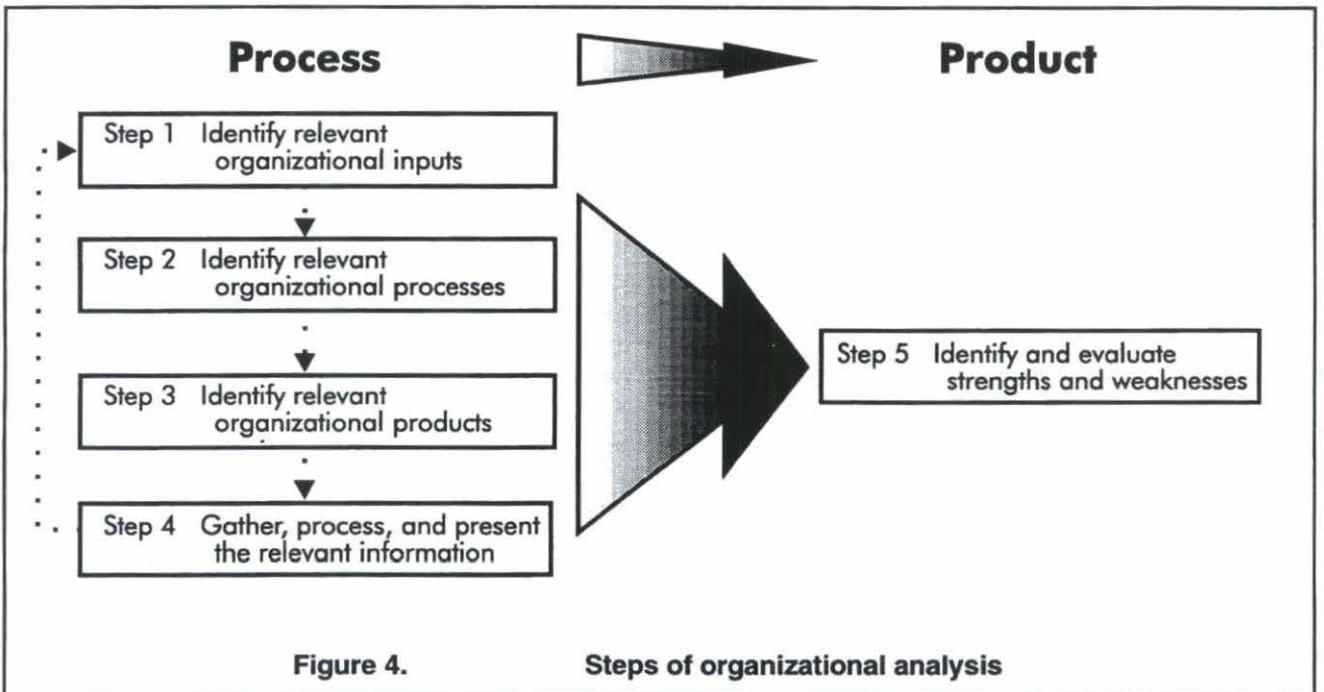
Financial resources can be directed towards reducing the biggest organizational weaknesses. The policy of reducing weaknesses has two goals: *first*, maintaining the institution’s position in the market, which can be a short-term objective; and *second*, stimulating institutional development and growth, which can be a long-term objective. Allocation of resources should first concentrate on eliminating weaknesses that are a high risk for institutional sustainability. Then concentrate on strengthening those that will favor long-term development. This gives the “intelligent investments” greater relevance within the strategic approach.

Organizational weaknesses should be classified as those that do not support the institution to use opportunities or those that do not protect it from threats. The other dimension for the classification of weaknesses is related to organizational inputs, processes, and products. Table 9, is a guide for gathering information about organizational weaknesses.

As many staff as possible should participate in identifying strengths and weaknesses. This methodology allows each administrative or research unit to analyze its own strengths and weaknesses, and to suggest those of other units. Figure 4 shows the steps of the process. After the process has been completed, the information should be carefully checked by the units to identify mistakes or omissions.

Table 9. Identifying organizational weaknesses in relation to the external environment

	Weaknesses that don't help use of opportunities	Weaknesses that don't protect from threats
A. Inputs 1. 2. 3.		
B. Processes 1. 2. 3.		
C. Products 1. 2. 3.		



Gap Analysis

The first two sections of this Sequence presented concepts and methods for identifying threats and opportunities related to the external environment and strengths and weaknesses derived from the internal structure and organization.

This section presents a framework for defining a desired future state of the institution, and actions to be taken to move toward it. As specified in the previous section, the objective is to identify the changes within the institution, its inputs, processes, and products, and how to implement them to arrive at the desired future state in a given period of time. Gap analysis is an approach to define actions needed to enhance institutional sustainability at the medium and long term. Gap analysis should answer this question:

What changes should be made in the inputs and internal processes to be able to offer the products or services that the clientele needs in the next five to ten years?

Once these changes are identified, management must make the necessary decisions. Decision-making is an essential phase for the institution to benefit from the analyses of the organization and its context. The decision-making is part of institutional policies, to be dealt with in the next sequence.

Definition of gaps

Gaps are differences between present and desired products, between existing inputs and the ones needed, and between current processes and the ones to be introduced.

Some examples are:

Product gap. An agricultural research institution specializes in the development of genetic materials to improve yield. It may find that government policies now promote exports of tropical fruit, so that within five years it must offer low-cost techniques for quarantine control to pass the barriers imposed by countries that import fruit.

Process gap. Upper-income consumers prefer foods that are not chemical by contaminated. A beef-production-improvement program analyzes beef by color, texture, and length of fiber, but now it must detect toxic residuals from drugs applied to prevent animal disease.

Input gap. A program to investigate the introduction of improved pastures finds difficulties in funding because it does not have an analysis component to measure the impact on the region's natural resources. It will probably be necessary to hire a biologist to fill this gap.

These are examples that can occur at different levels of the research, institution, program, or project. Gaps should also be identified at different administrative levels, such as experimental stations, regional centers, central offices, etc. This explains the need for employees of all levels to participate in identifying the gaps.

Identification of gaps

The quality of gap identification and analysis depends on the quality of prior organizational and environmental analyses. If in these analyses institutional strengths and weaknesses are related to opportunities and threats in the environment, gap analysis becomes meaningful and easier.

These three analyses have been presented separately for the sake of clarity, but they can actually be carried out together as one exercise, in which the information flows throughout all steps. Gap identification and analysis follows four steps:

Steps to identify and analyze gaps

- 1. Form a committee that is responsible for carrying out gap identification and analysis.*
 - 2. Discuss in detail the relations among opportunities, threats, strengths, and weaknesses.*
 - 3. Produce list ordered in terms of relevance.*
 - 4. Make results known internally.*
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Ideally, this committee should be the same that carried out the organizational analysis—that is, those who know more about internal operations and structure. To make sessions productive, this group should be relatively small. However, since gap identification covers different management and operational levels of the institution, the appropriate actors may be invited when detailed information is required.

The committee should discuss existing relations between the threats and opportunities identified in the external environment, and the corresponding strengths and weaknesses at the internal

organizational level. The objective of the discussions should be to clearly determine the activities to arrive at the desired institutional situation.

Since the committee is not a decision-making body, its recommendations should clearly establish the institutional and budgeting implications that implementation would have. For example, strengthening a program could lead to the redefinition of the position of the program director, giving him greater autonomy in budgeting, thus including him in the *management*. The better these implications are explained, the more people will accept the recommendations of the committee.

The following step, is producing a list of gaps in order of relevance, which helps to distinguish **necessary** actions from **recommended** actions. At this point, the priorities for the allocation of funds will be under discussion. Conflicts of interest can arise within the institution, which makes it advisable to negotiate the recommendations, arriving at an agreement by consensus. If this is not done, the directors may encounter in implementing the recommendations.

The next step is the distribution of results among staff. This should be a continuous process, carried out as the gaps are identified. The feedback that the committee receives will serve for reformulating proposals or identifying alternative procedures.

Up to this point, the emphasis has been on internal negotiation. But gaps and proposals for action must have the frame of reference of the institution's external capacity for negotiation. A typical example is the rigidity of the budget from with respect to funding from the national treasury. Other aspects have to do with limitations in changing specific objectives, contracting and handling personnel, regional coverage, etc.

Criteria of hierarchy

In order to establish criteria of hierarchy in setting priorities in gaps, it is necessary to reemphasize the general objective of this three-part exercise—analyses of the external environment, of the organization, and of gaps. The objective is related to the sustainability and development of the

institution. For this reason, establishing a priority for gaps means getting closer to the problem of risks.

Intuitively, the first and greatest effort is put into reducing, or, if possible, eliminating the risks to the institution's sustainability or survival. They materialize as a loss of credibility with farmers and the public at large.

The second category of risks is one that could emerge from future developments in the institutional environment. The information comes from the trends observed in the variables that affect this environment. However, unlike to the *previous* category, it is impossible to foresee the evolution of a situation, so decisions must be more cautious, aimed at improving the institution's flexibility to modifications in the demand for products or services offered.

The third category of risks is the possibility that the institution alters its business environment through innovations. Such an innovation could be a new product, process, input, or combination of these. The uncertainty in the case of innovations is greater.

As in any allocation of funds, the main limiting factor is the total amount of funds. In agricultural research institutions, the main restrictions for closing gaps are lack of human and financial resources. If both types of resources are relatively scarce, the institution should concentrate its efforts on the first category of gaps, those that jeopardize the institution's sustainability. If resources are relatively sufficient, it is better to find a strategy that combines activities covering the three categories.

Table 10 suggests a format for processing information related to identifying, analyzing, and priority setting for gaps. Points 2 through 6 provide a useful exercise in classifying gaps in numerical terms.

The *institution* has one major reason for carrying out the three types of analysis given in this sequence: to generate objective, reliable information with which to construct a strategic plan. The following sequence covers this theme. Figure 5 shows how these three analyses are related.

Table 10.

Format for identifying, analyzing, and priority setting for gaps

1. Description of gap (A) _____				

2. Classification (B)				
Input:	_____			
Process:	_____			
Product:	_____			
3. Characterization (C)				
Weakness for facing a threat:	_____			
Strength for facing a threat:	_____			
Strength for taking advantage of an opportunity:	_____			
Weakness for taking advantage of an opportunity:	_____			
4. Type of risk faced (D)				
Present institutional sustainability:	_____			
Adapting to future environmental conditions:	_____			
Changes in the institutional environment (innovation):	_____			
5. Demand of institutional resources (E)				
		low	medium	high
Financial	_____	_____	_____	_____
Human	_____	_____	_____	_____
Infrastructure	_____	_____	_____	_____
Others _____				
6. Possibilities of external negotiation (F)				
High:	_____			
Medium:	_____			
Low	_____			
Notes				
A. In the description, be brief and use precise terms that permit identification of the activity to be carried out.				
B. Relate a gap to its highest classification. For example, in introducing a product that requires new processes and inputs, mark it as a product.				
C. Mark the appropriate main objective to be achieved.				
D. Mark the type of risk one hopes to reduce by eliminating this gap.				
E. Estimate the resources needed for implementing the action, in relation to the available resources and the needs caused by other gaps.				
F. This refers to external negotiations the institution would have to carry out to implement the proposed activities.				

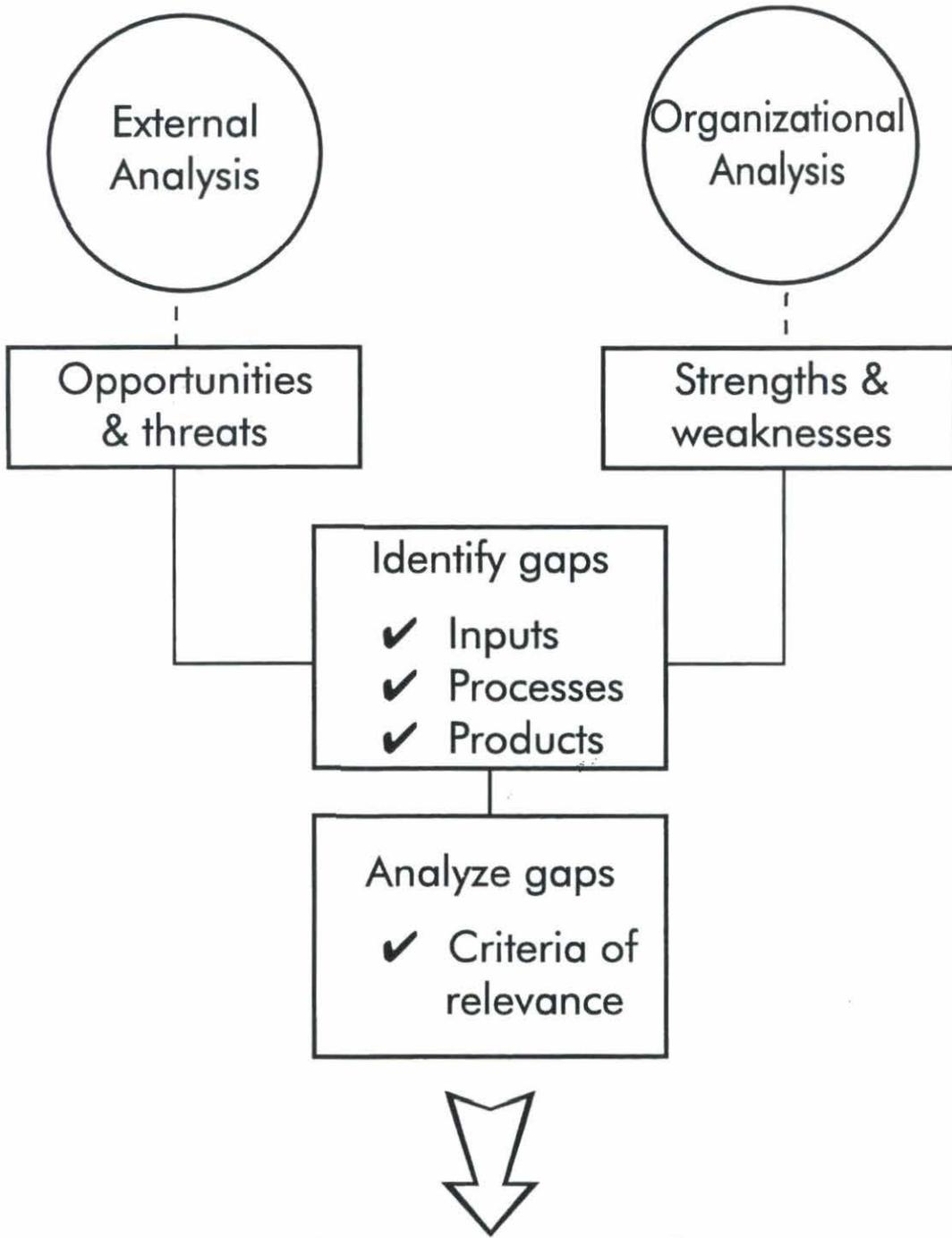


Figure 5. Process for generating information to formulate a strategic plan

Summary

This Sequence presented and applied the concepts and methods of the strategic approach to analyze the external environment, organization, and gaps of an agricultural research institution or program.

The external analysis consists of five steps. The first step shows that the relevant external environment includes a general external environment (socio-cultural, economic, political, legal, and technological), and an operational environment (regional, national, and international clients, users, partners and competitors, whether present or potential). It presents procedures for identifying and interpreting these dimensions. The second step specifies the methods for defining and ordering the critical external factors by importance. The third step shows how to select the key sources of information to analyze critical external factors. The fourth step introduces a set of procedures for identifying and evaluating those factors. Finally, the fifth step offers the methodology for identifying opportunities and threats. The sequence emphasized the importance of the external analysis as a base for later organizational and gap analyses.

The organizational analysis, (a) identifies the aspects to be analyzed, (b) elaborates a working hypothesis, (c) identifies the kind of information

needed, (d) identifies who will gather the information and how, (e) determines how the information will be processed, and (f) identifies how the results and conclusions will be presented.

This part showed how to guide the organizational analysis with the CIPP model. This included the key questions for analyzing organizational inputs, the four most relevant organizational processes, the key questions for analyzing an organizational process, and the main products of agricultural research. Finally, from this information the method for identifying and evaluating organizational strengths and weaknesses was derived.

The last part of the Sequence defined the gaps as differences between the present products and those desired, between the existing and the needed inputs, and between the present processes that need improvement and those that need to be introduced. Four steps were laid out for identifying, analyzing, and prioritizing input, processes, and products gaps.

The external, organizational, and gap analyses are essential for formulating the strategic plan for an institution or program. This is the subject of Sequence 3