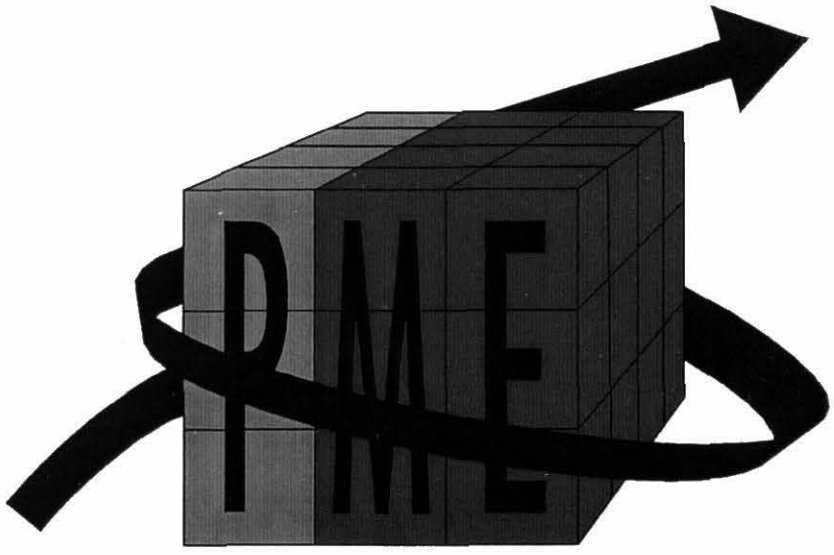
Training in Planning, Monitoring and Evaluation for Agricultural Research Management

Module 2

Strategic Planning



Jairo E. Borges-Andrade
María Delia Escobar
Julio Palomino
Roberto Saldaña
José de Souza Silva

isnar
International Service for National Agricultural Research

1995

CIAT
Centro Internacional de Agricultura Tropical
International Center for Tropical Agriculture

Strategic Planning in Agricultural Research Management

UNIVERSIDADE DO BRASILIA
University of Brasilia,
Brazil

FONAIAP
National Agricultural
Research Fund,
Venezuela

INIAP
National Autonomous
Institute for Agricultural
Research,
Ecuador

INIFAP
National Institute for
Forestry and Agricultural
Research,
Mexico

EMBRAPA
Brazilian Corporation for
Agricultural Research,
Brazil

1995

Module 2

Authors:
(in alphabetical order)
Jairo E. Borges-Andrade
María Delia Escobar
Julio Palomino C.
Roberto Saldaña A.
José de Souza Silva

Advisor:
Rafael Posada

Coordinators:
Vicente Zapata S.
Douglas Horton
Juan Cheaz

Reviewers:
Marie-Hélène Collion
Luis Macagno

Producers:
Sandra Del Mar Sacanamboy
Nora Cristina Mesa C.

Design:
Juan Carlos Londoño

isnar CTA CIAT

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Reproduction

Send us your ideas

Training materials such as these are not finished products but works 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 these training materials***. We would also be interested in learning about your experiences (positive and negative!) using these materials in training and in institutional-change processes.

Contents

Foreword

Agricultural research organizations are passing through a difficult time. The current trend of reducing the role of the state and privatizing many of its activities are putting public-sector organizations in a critical situation. The resources available for research are becoming scarcer while the debate over the role of public, private and non-governmental organizations in research and in the development of agricultural technology is heating up. The public is questioning the organizations' mandates and working strategies and, in some cases, the organizations' reasons to exist.

Agricultural research leaders in Latin America and the Caribbean are well aware of this trend. They have concentrated considerable effort on restructuring their organizations to improve performance and, ultimately, assure their survival. These efforts point to the growing need to improve management in key areas such as planning, monitoring and evaluation (PM&E).

Responding to the region's critical management situation, ISNAR, in 1992, began the project "Strengthening Agricultural Research Management in Latin America and the Caribbean," aimed at developing training materials and organizing courses on PM&E.

The simplest path to take would have been to develop materials based on the latest and best general-management texts, and conduct courses. This approach would have been risky, however, since it would have offered materials that didn't necessarily respond to needs of agricultural organizations.

Thirteen case studies were carried out to document the principal training needs and opportunities in the region. Eleven research managers and consultants from the region elaborated the studies and presented the case study reports to research leaders and managers in a regional workshop, held in Mexico in October of 1992.

In May 1993, 18 professionals from various organizations in the region with vast experience in agricultural research management elaborated a set of training materials with the supervision and support of ISNAR and CIAT's Training Unit.

From this first effort until the publishing of these modules, the authors, reviewers and consultants have worked with great dedication to apply, test and adjust the materials during courses and meetings. These individuals, working as a group, have created a valuable training tool. The PM&E modules are flexible and can be used in diverse training events and adapted to suit the varied needs of course participants.

We believe that this interinstitutional effort has been very fruitful. We have the pleasure to offer the present module as a working tool for all of you who are dedicated to strengthening agricultural research management in the region, and as an input for future efforts in management training.

Christian Bonte-Friedheim
Director General, ISNAR

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 de 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.

The Authors

General Information on the PM&E Training Materials

The Project "Strengthening Agricultural Research Management in Latin America and the Caribbean"

Agricultural research organizations are passing through a difficult period, in which their mandates, activities and results are questioned. Society's demands for research that contributes to production, welfare and natural resource conservation is increasing. At the same time, the financial resources available for research are becoming scarcer.

Latin American and Caribbean countries have not escaped from these global trends. Many of the region's agricultural research institutions have an uncertain future. Research leaders are searching for new approaches and methods that will assure the sustainability of their institutions and the efficient use of scarce resources.

In response to this situation, ISNAR, in 1992, began a project entitled "Strengthening Agricultural Research Management in Latin America and the Caribbean."

Many individuals and research institutions have played an important role in the project. The project staff's first task was to conduct an exhaustive literature review and carry out 13 case studies on planning, monitoring, and evaluation (PM&E) in agricultural research institutions in the region. The results of these activities were analyzed in a regional workshop held in Mexico in October 1992. The institutional experiences documented in the case studies provided a diagnosis of PM&E in the region and of the training needs and opportunities.

ISNAR teamed up with CIAT's Training Unit to form a group of trainers and prepare a series of training materials on PM&E. In May 1993, 18 professionals involved in agricultural research management in the region participated in a workshop for training trainers at CIAT and prepared the first drafts of four training modules.

After the workshop, the authors met at CIAT individually or in groups to revise and improve the modules in light of the experience gained during three PM&E courses conducted in Uruguay, Ecuador and Trinidad between October 1993 and April 1994.

The sustained strengthening of PM&E in agricultural research institutions can greatly benefit from the use of the project's outputs, which include:

- a select team of trainers
- a methodologically sound set of training materials

- a proven and effective methodology to guide training
- general-reference materials about PM&E

ISNAR, in line with its mandate, will continue to support the initiatives of the region's agricultural research institutions to strengthen their institutional capacity and competence.

Target Group

These modules have been designed to train professionals of both public and private institutions who are involved in the PM&E of agricultural research in Latin America and the Caribbean.

Course participants may be highly heterogeneous in their professions (engineers, sociologists, and economists), their administrative and academic experience.

The training modules are targeted for middle-management officials (heads of planning departments, directors of regional experiment stations, heads of research programs), although at times top management officials and researchers would also participate. A training needs assessment conducted by the project indicated that the target group is very interested in receiving this type of training. It is expected that the participants selected for training courses will be genuinely interested in using the tools and methodology provided to improve PM&E processes in their own institutions.

Training should enhance participants' knowledge, skills, and attitudes required to (1) influence decisions and policies to incorporate integrated PM&E processes and (2) apply the principles, methods, and tools that consolidate these processes within institutions, programs, and projects, to improve the quality of research and its results.

Training groups will normally include between 20 and 25 professionals involved in PM&E activities. It is important that they have the support of the top management of their institutions to increase the chances that post-training changes in skills and attitudes are implemented and enforced. The training events and the complementary instruction materials attempt to create a multiplier effect in which trainees disseminate the principles, methods, and tools they have learned to use.

The Training Modules and Manuals

The training materials in PM&E were prepared through an agreement between the International Center for Tropical Agriculture (CIAT) and the International Service for National Agricultural Research (ISNAR).

The series of four Modules *for instructors* in management training contain the following titles:

Module 1: The strategic approach to agricultural research management
Module 2: Strategic planning in agricultural research management
Module 3: Monitoring in agricultural research management
Module 4: Evaluation in agricultural research management

A series of four manuals has been produced with the same titles but specifically designed for *participants* in PM&E workshops and courses. The modules and manuals complement each other. The instructor has a series of overhead transparencies that can be used during presentations and printed materials that can be photocopied and distributed to participants.

Reference Materials

The project has also prepared the following three books containing additional information about PM&E to guide individuals who wish to establish training programs or train trainers in agricultural research management:

Monitoring and Evaluating Agricultural Research: A Sourcebook. 1993. Horton, D.; Ballantyne, P.; Peterson, W.; Uribe, B.; Gapasin, D.; Sheridan, K (eds.). CAB International: Wallingford. This reference book compiles diverse concepts, methods and information sources about the principal aspects of agricultural research monitoring and evaluation.

Administración de la investigación agropecuaria: Experiencias en las Américas. 1994. Novoa B., A.R. and Horton, D. (eds.). Tercer Mundo Editores in association with ISNAR and PROCADI: Santafé de Bogotá, Colombia. This book reports on the experience gained by the project through the case studies, meetings, consultancies and analyses of agricultural research management in the region.

Training of Trainers in Agricultural Research Management. 1995. Zapata, V. International Center for Tropical Agriculture (CIAT) in association with ISNAR: Cali, Colombia. This train-the-trainers manual discusses the process of training the project's trainers, and explains in detail the steps in planning, conducting, and evaluating training events and in designing training modules.

Preparing the Modules

The modules were prepared using a methodology to develop training materials which CIAT has successfully developed and tested. A large group of authors, production assistants and consultants interacted with project personnel for one year to attain the different products, particularly the training modules. The chronology of this process is summarized in Table 1.

Train-the-trainers workshop

The first drafts of the four training modules were prepared in a Train-the-Trainers Workshop held 10-28 May 1993 at CIAT. Eighteen professionals from 13 institutions and 10 countries participated in the workshop.

Test of the modules and internal review

The training modules benefited from two trial runs. The first was a sub-regional PM&E course for the Southern-cone countries held in Uruguay in August 1993. The second was a sub-regional PM&E course for the Andean countries, Mexico, and Central America held in Ecuador in September 1993. Fifteen instructors participated in the two workshops.

In each course, the training materials and the instructors were intensively evaluated. Immediately after each event, the instructors revised and corrected their modules.

After the second course, a group of trainers met in CIAT for a week to review the design and content of the course and all the modules. R. Posada, A.M. Ruíz, L. Romano, A. Novoa and J. de Souza participated in this internal review.

External review of the modules

In December 1993 and January 1994, eight specialists in different aspects of planning, monitoring and evaluation reviewed the modules. In March 1994, L. Romano, R. Posada and A. Novoa met in CIAT to incorporate the suggestions of the external reviewers into the final draft of the modules.

During the entire process of the production of the modules, Douglas Horton, Juan Cheaz (ISNAR), Vicente Zapata and personnel of CIAT's Training Unit served as facilitators and as sources of information about research management, adult education, the organization of training event, and preparation of the training materials.

Features of the PM&E Training Modules

This training module consists of a package of materials designed to facilitate the learning and teaching of PM&E. It is part of a series of four modules. You can use all four modules together as a complete course or separately as part of a specialized course in one of the selected themes.

Table 1. Authors and reviewers of the training modules, and instructors of the first two PM&E courses

Module	Authors	Instructors		External Reviewers	Internal Reviewers	
		1st Course	2nd Course		1st revision	2nd revision
1	Silvia Gálvez (INIA) Andrés Novoa (PROCADI) José de Souza (EMBRAPA) Marta Villegas (MAG)	Silvia Gálvez José de Souza	Andrés Novoa José de Souza Marta Villegas	Enrique Alarcón (IICA) Bruce Johnson (University of Sao Paulo, Brazil)	Andrés Novoa	Andrés Novoa
2	Jairo Borges (U. de Brasilia) María Delia Escobar (FONAIAP) Julio Palomino (INIAP) Roberto Saldaña (INIFAP) José de Souza (EMBRAPA)	Jairo Borges María Delia Escobar	Julio Palomino Roberto Saldaña	Marie-Hélène Collion (World Bank) Luis Macagno (INTA)	Rafael Posada José de Souza	Andrés Novoa Rafael Posada
3	Alan Bojanic (IBTA) Guy Hareau (INIA) Rafael Posada (Colombia) Ana María Ruíz (INTA) Emilia Solís (MAG)	Guy Hareau Ana María Ruiz	Rafael Posada Ana María Ruíz	Nohora Díaz (ICA) Govert Gijsbers (Ministry of Foreign Affairs, The Netherlands)	Rafael Posada Ana María Ruíz	Rafael Posada
4	Alicia Granger (INTA) John Grierson (INIA) Tarcizio Quirino (EMBRAPA) Luis Romano (ICA)	Alicia Granger John Grierson	Luis Romano Tarcizio Quirino	George Norton (Virginia Tech, EEUU) Luis Zavaleta (IDB)	Luis Romano	Luis Romano

Each module has three types of information:

- Guidelines for instructors and participants that facilitate the learning process
- Technical information on the specific subject matter
- Appendices that complement the technical information or facilitates the training process

The modules include information about the target group and instruments to assess the participants' expectations and their knowledge of PM&E. They also contain practical exercises and instructions as well as feedback sessions for each exercise. Finally, the modules include tools to evaluate the training event and the instructors.

Training Methodology

This training module is not a textbook, but a tool designed to help instructors motivate course and workshop participants and facilitate the learning process. It helps the instructor inform participants about sources of information that can be useful in improving agricultural research management in their institutions.

The modules are designed to be used in courses and workshops in which participants learn by interacting with other participants, exchanging information and experiences, and by formulating hypotheses and answers to the conceptual and practical problems of agricultural research management in their institutions.

The active learning approach encourages, the development of knowledge, skills and personal attitudes to apply methods of PM&E.

The modules focus on the participants and their learning. The exercises and presentations allow the instructor to monitor the learning process and revise his/her instruction methods to best suit the participants' needs.

These features distinguish the modules from the style and structure of scientific materials.

Other idiosyncrasies of the modules

The modules are products of the intensive work of a group of professionals of diverse nationalities, experience and professional development. Hence, the content and style of each module do not reflect the viewpoint of a single expert but the consensus of specialists: the authors who prepared it and the reviewers who made suggestions.

The authors discussed the form and content of the modules during the workshops and courses. This gave them the opportunity to develop standards on various aspects of PM&E and the best way to develop the necessary knowledge, skills and attitudes of participants so they can improve PM&E in their institutions.

Despite this consensus, each module maintains the form and content that the authors developed during the project.

The action plan

Since the modules focus on action, the training designers agreed that the participants should produce a brief action plan that they could bring back to their institutions. While preparing the plan, participants would transform all that they had learned during the course into concrete proposals that would help improve the PM&E process in their institutions.

An action plan is a document that contains:

- a list of priority problems of PM&E in the institutions that the participants represent
- the strategies the participants hope to use to solve the identified problems
- a summary of the "project" to present to the authorities of the institution to obtain their support

Outline for a PM&E Course

A typical PM&E course would consist of the four modules. Nevertheless, since training needs differ, you should consider the series as a menu in which you select only what you need. You can use each module alone for a course that analyzes in depth any of the themes of the modules. Likewise, you can use several modules together with other related materials (e.g., management information systems).

When you use the four modules of this series in a course, you should devote a day to each module. Leave a half day for the introductory activities (participant registration, group dynamics, pretest and presentation of the course program) and another day and a half for developing and presenting the action plans, event evaluation and closing (Table 2).

Experiences from PM&E courses and workshops on similar ones show that learning and subsequent action improve if participants prepare their action plans during the event. Therefore you should leave time at the end of each day for participants to prepare their action plans.

Regardless of which course schedule you use, you should devote half of the course to conduct practical exercises, group discussions and presentations of the exercises' results. Instructors should try to make their presentations as short as possible and take advantage of the feedback sessions thus helping the participants in areas where they need additional information.

The final decision on the design of a PM&E course that uses these modules and methodology becomes the responsibility of the local coordinators. They know the backgrounds of the participants and can accommodate the materials and length of time dedicated to each theme so that the course will adequately cover the themes of greatest interest. The local coordinators can suggest that participants study less-urgent themes on their own after the course.

Table 2. Possible schedule for a six-day PM&E course

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Morning	Arrival of participants	Module 1	Module 2	Module 3	Module 4	Preparation of action plans Course evaluation	Departure of participants
				Lunch			
Afternoon	Opening Group dynamics Expectations Pretest	Preparation of actions plans				Presentation of plans Closing	

How to Use the Modules

These training modules focus on *trainining in PM&E in Latin America and the Caribbean*. Hence, specific geographical references are made. If you want to use the modules in other regions you should adapt the content and exercises accordingly.

The modules are divided into *instruction sequences*, including methodological resources and support materials that will facilitate the learning process. For optimal use of the module, consider the following suggestions.

Know the components

Make sure that the module's components are in good condition and in the proper order. Get familiarized with them and make sure you have an overhead projector that is in working order. Estimate the time it will take to carry out the discussions, exercises, presentations, etc. Prepare the classroom and the training materials you will need for each exercise. Finally, make sure all other support and teaching materials are at hand.

Participants are the protagonists

Always keep in mind that the workshop participants themselves determine how much they will learn. Therefore, encourage them to actively participate. Review the flow chart frequently and make sure you are on schedule. Avoid unnecessary personal discussions and keep in mind that time is usually short. Take notes of what you think would improve content and methodology. Emphasize specific objectives so that the audience will concentrate on them. Direct the participants' attention to the main points, highlighting the relevance they have to the terminal objective of the module.

At the beginning of each instruction sequence, you should discuss its specific objectives, then present the content, and finally introduce and develop the exercises.

The tests

Participants will take a pretest, at the beginning of the training event and a posttest, at the end. Both evaluations are formative; in other words, they give participants a chance to evaluate their own progress during the course. They are not designed to give participants a grade.

Content selection

Don't forget that there are manuals that you should distribute to the participants. You should also choose those parts of the module that you feel should be handed out to the participants. Make sure you have photocopies of the material ready for them. You may also want to distribute photocopies of the overheads you use. You should also suggest that participants consult the bibliography for more information about topics that interest them.

Take care of the materials

After using the module, make sure all materials are in good condition and properly organize them in the three-ring binder. This is particularly important for the overhead transparencies, which can easily be damaged.

General Guidelines for Conducting Group Exercises

Throughout this module you will conduct group exercises. Follow these guidelines for conducting them:

- Form groups of no more than six persons. Form the groups randomly so they are well mixed.
- Instruct each group to choose a moderator and a rapporteur.
  The *moderator* makes sure the group completes the exercises on time and motivates the group to focus its discussions and conclusions on the selected themes and objectives.
  The *rapporteur* records the group's conclusions and prepares the transparencies and handouts to present during the plenary session.

- Tell the groups that they must finish within the time allocated for exercise. Check on the groups occasionally to make sure they are progressing on schedule.
- Constantly supervise the groups and make sure all the members participate and answer any questions they may have.
- Make a summary of the plenary session presentations that reinforces the principal ideas.

Instruction Terminology Used in the Modules

Instructors who have not participated in the training of trainers courses will no doubt encounter a few new terms when they use the modules. The most frequently used instruction technology terms are defined below.

Assessment of expectations. Activity in which participants express what they hope to achieve during the training. The instructor can compare the participants' expectations with the course objectives and point out to the participants where they should direct their learning efforts.

Feedback. Answers, suggestions or results of the exercises that training participants make. Feedback helps guide the instructor to revise the materials, or, in case of a questionnaire, review the answers that are considered correct for the questions.

Flowchart. Illustration of the general structure of a module or of a learning sequence. A flow chart shows the steps participants must make to achieve the learning objectives. The most important components of the flow chart are: the objectives, the content and the practical exercises.

Group dynamics. Activity that the instructor conducts at the beginning of a training sequence to stimulate participation, the exchange of knowledge between the instructor and participants and teamwork.

Instruction sequence. Part of a learning module. Its components can vary, but in general, an instruction or learning sequence contains (a) one or more objectives, (b) the information needed to achieve the objectives, (c) one or more practical exercises, and (d) a feedback section that presents the instructor with suggestions or answers about possible outcomes or answers to the exercises conducted.

Learning module. Printed, visual or audiovisual materials designed to facilitate the learning and teaching process. (Also known in other series of materials as *learning units*.)

Pretest. A questionnaire given before a training event to measure knowledge or attitudes before participation. A pretest is used as a baseline for comparison with one or more posttests (administered after the event).

Group Dynamics: A Photograph

General Guidelines

This is an exercise which helps integrate the participants and encourages them to participate in all the activities in the module. In particular, it offers them an opportunity to experience how communication may be distorted.

Suggested time: approximately 30 minutes, depending on the number of participants.

Required Materials

- Paper and pencil for each participant.
- A photograph (20 x 25 cm) chosen by the instructor, preferably one that may be open to varios interpretations.

Steps to Follow

- The instructor asks for a volunteer to begin the activity.
- The volunteer and the instructor leave the group to look at the photo. The volunteer writes down as many features of it as possible. (The others do not see the photo.)
- The volunteer gives the instructor the photo and the list of its features, and the returns to the group.
- The instructor tells the group that the volunteer will describe the photo to the person on his right. Only that person can hear the description; questions may asked, but for only two minutes.
- Then that person passes on the information to the next person, making sure that no one else hears it. The process continues until everyone knows the features.
- The last person to receive the information tells the group what he/she was told.
- Then the instructor reads the original description written by the volunteer and shows the photo to the group.

The instructor leads a discussion using these questions to stimulate participation:

- Was the final description very different from the first one? If so, why did this happen? Can the group identify any of the difficulties in communication?
- When the participants saw the photo, did they think it matched the description they were given? What does this tell us about communication?

- How could we apply what we learned in this activity to our work as we study the module? How can we be more precise in our perception and in our communication?

Learning Expectations

Guidelines for the Instructor

By examining the participants' expectations, the instructor can find out what they hope to learn in this workshop.

This exercise enables a comparison of the participants' expectations with the objectives proposed by the instructor.

Proceed as follows:

- Give each person the questionnaire with the instructions for the exercise on learning expectations
- Organize groups of about five people each
- Let each group summarize their expectations

Recommended time for group work: 20 minutes.

- The instructor will compare the expectations that each group presents with the objectives of the module

Learning Expectations

Participants' Guidelines

Dear participant:

We would like to learn your expectations about this module. Please anwser the following questions briefly.

Time: 20 minutes

Your name: _____

Institution where you work: _____

Main responsibility at your present job:

a. ❑ Research
b. ❑ Extension
c. ❑ Teaching
d. ❑ Management
e. ❑ Other

1. Introduce yourself to the group members.

2. What do you think is the principal problem of planning, monitoring, and evaluation (PM&E) in your institution? _____

   _____

   _____

3. What do you expect to learn that helps you resolve these problems?

   _____

   _____

   _____

4. What experience and training do you have in planning agricultural research that you think can be useful for other group members?

   _____

   _____

   _____

Pretest

Guidelines for the Instructor

- Before handing out the questionnaire, tell the participants that it has not been designed to test them, but to find out what they already know about the topics dealt with in the module. Their answers will help compare their initial knowledge with what they have learned by the end of the event.
- Hand out the questionnaire to the participants.
- When everyone has finished the questionnaire, provide them with the correct answers so each person can check his/her responses.
- Briefly discuss with the participants any doubts about answers that are different from the ones you presented, without going into much detail. Explain that the answers will become clearer during the study of the module.

Pretest

Participant Guidelines

Time to respond:
30 minutes

The following questions will help you identify what aspects of Strategic Planning in Agricultural Research Management you are familiar with.

1. What unit(s) within your organization carry out planning, and what planning documents are produced? _____

2. What do you consider necessary for analyzing the external environment of your institution? _____

3. What are the basic things needed to formulate the mission, goals, strategies, and policies in your institution? _____

4. How would you implement participatory planning in your institute? How would you link this with M&E? _____

Pretest - Feedback

Guidelines for the Instructor

This information should be discussed with the participants before giving them the module's goals and after exploring their expectations. The instructor will present feedback verbally or in writing, so participants can review their answers.

Time suggested for this activity: 15 minutes

Possible answers to the five questions:

Question 1

What is expected here is a description of the administrative levels (national, regional, local and institutional) where research planning is conducted:

- Global planning, by centers or by regions
- Research programs, projects, and activities

The answer may include levels of research such as program coordination, project, or unit coordination. Documents may include global plans, (by centers or regions), research program plans or project plans

Question 2

A description of the procedures, such as: consulting documents or experts about present or future tendencies and about political or socioeconomic trends in the environment, and how these affect the institution.

Question 3

A description of the steps for a participatory methodology in planning, involving internal and external groups to formulate goals and policies, with respect to future alternatives as stated in the previous question.

The participatory methodology includes gathering data and consulting decisions with the stakeholders, either external or internal.

External sectors can be the Ministry of Agriculture, the extension services, agroindustry, producers' associations, universities, science and technology councils and politicians.

Internal groups include directors, researchers, those who transfer technology, administrative personnel, lab and field technicians.

Question 4

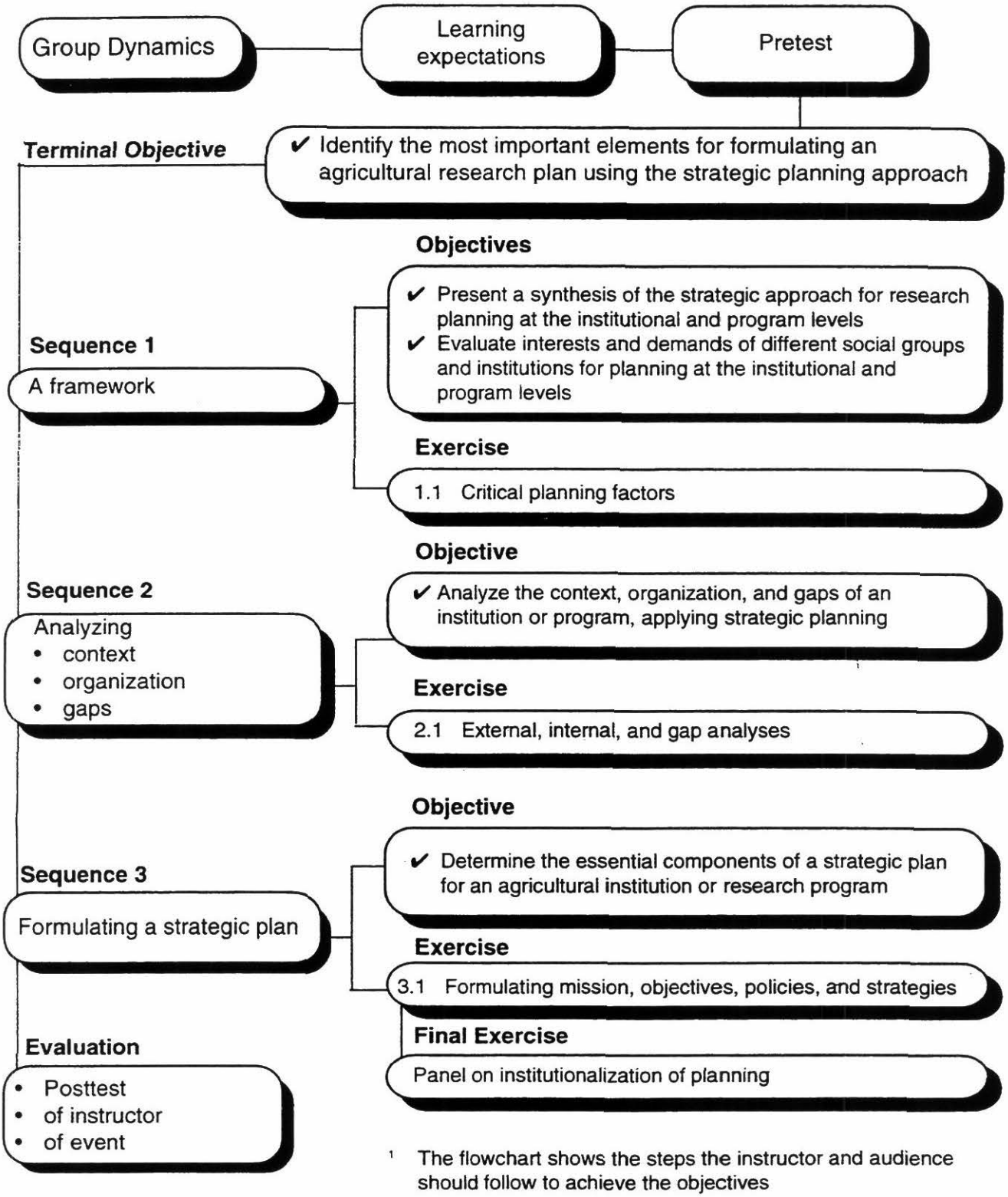
Participatory planning implies carrying out actions that tend to:

- establish an institutional image for both internal and external groups;
- sensitize internal and external groups in relation to institutional goals;
- stimulate negotiation processes to obtain resources and political support;
- promote training in planning;
- decentralize consultations, proposal writing and decision making.

The links between PM&E activities should be expressed in terms of mechanisms that guarantee:

- continuous flow of information among these processes;
- congruency between the processes;
- avoiding unnecessary repetition.

Flowchart[1] for Module 2



[1] The flowchart shows the steps the instructor and audience should follow to achieve the objectives

Objectives of Module 2

Terminal Objective

After studying this module, participants will be able to:

- ✔ Identify the most important elements for formulating an agricultural research plan, using the strategic planning approach.

Sequence 1 Objectives

- ✔ Present a synthesis of the strategic approach for research planning at the institutional and program levels.
- ✔ Evaluate interests and demands of different social groups and institutions for planning at the institutional and program levels.

Sequence 2 Objective

- ✔ Analyze the context, organization, and gaps of an institution or program, applying strategic planning.

Sequence 3 Objective

- ✔ Determine the essential components of a strategic plan for an agricultural institution or research program.

Introduction to Module 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.

Module 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 on 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 Module 2 reflects the CIPP model (Mulholland, 1994), 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.

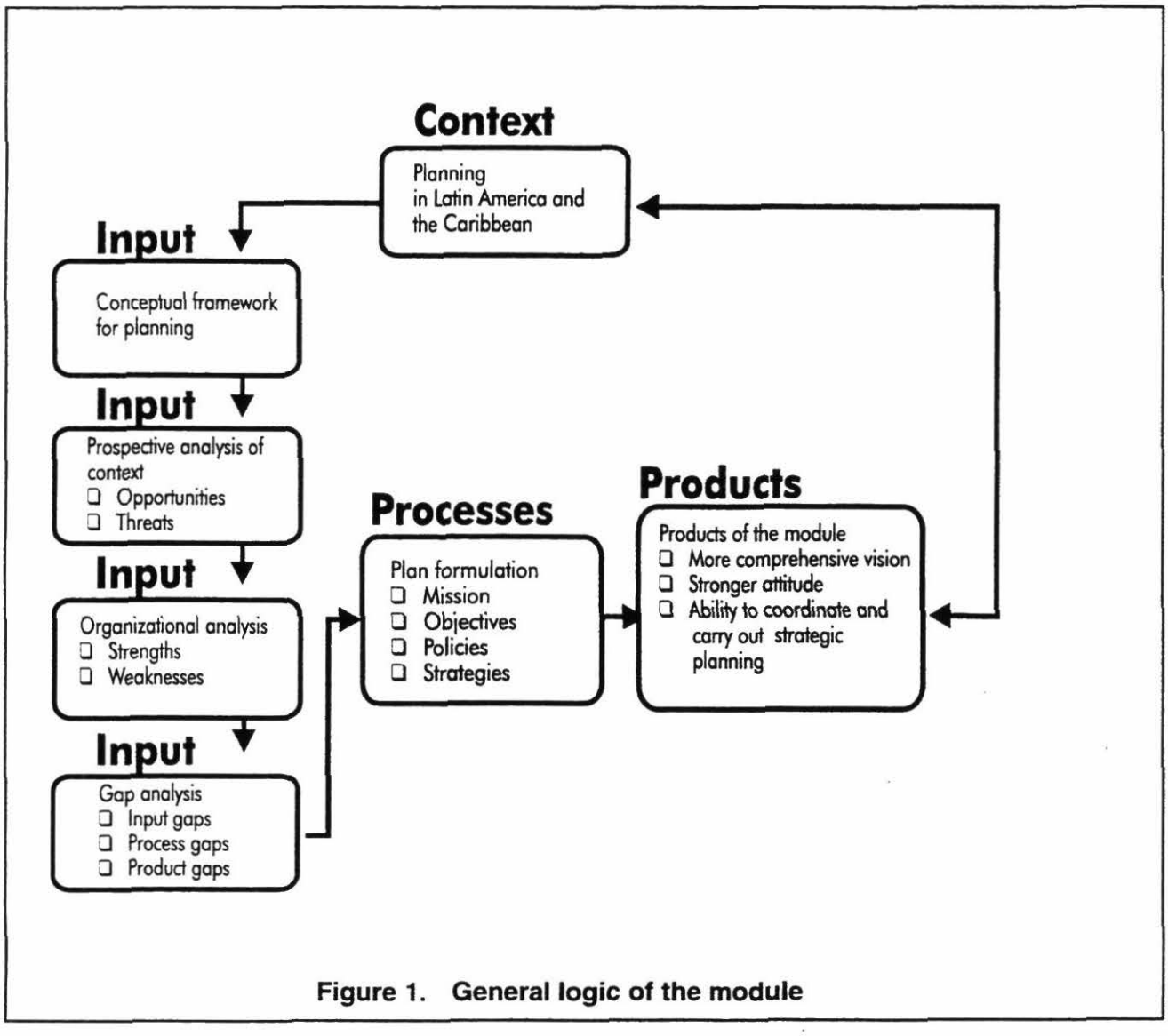
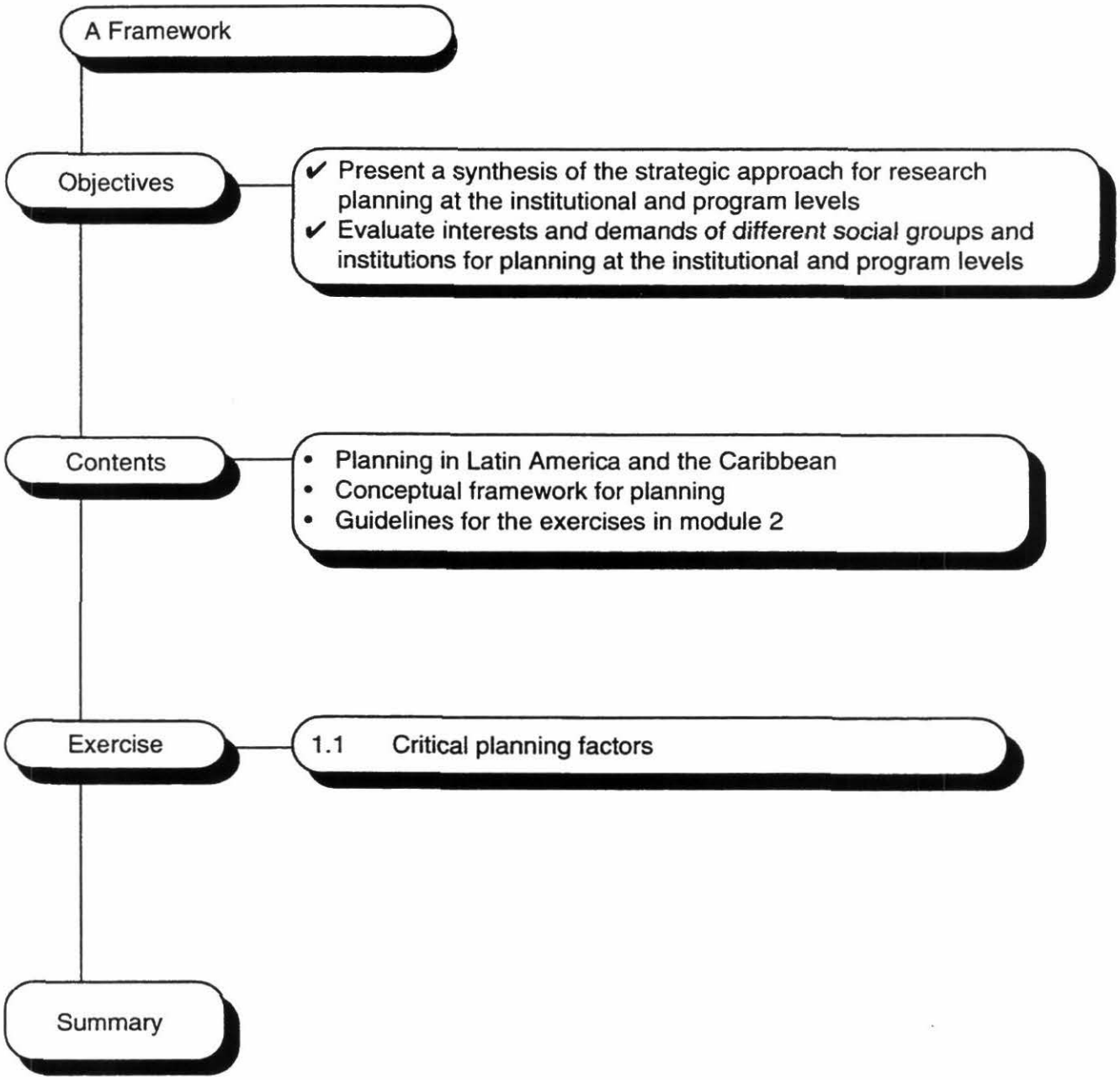


Figure 1. General logic of the module

Sequence 1. A Framework

Flowchart for Sequence 1



Objectives of Sequence 1

By the end of this sequence, the participants should be able to:

- ✔ Present a synthesis of the strategic approach for research planning at the institutional and program levels.
- ✔ Evaluate interests and demands of different social groups and institutions for planning at the institutional and program levels.

Introduction

The world-wide 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

Glogal 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 eficiency, efficacy, and effectiveness depend on its capacity to respond to 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 the Agricultural Research Institutions in LA&C

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 prefered 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 that 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 form 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 3 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.

Table 3. **Decision-making levels and types of planning**

Decision-making level	Type of planning	Characteristics
Top management • strategic level • strategic decisions	**Strategic planning**	• Diagnostic and pronostic process that considers the institution as a whole, as an open system, and in relation to its environment • Long-term objectives, goals, policies, priorities, and strategies (10-15 years), which indicate the tactical planning • More comprehensive, with greater risks and less flexibility than tactical and operational planning.
Middle management • tactical level • tactical decisions	**Tactical planning**	• *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 • operational level • operational decisions	**Operational planning**	• 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

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.

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	• Global policies • National strategy	• Market trends • Scientific and technological trends
National Institute	• Broad strategic areas	• National budget • Macro policies • Sectorial policies
Regional Centers	• Specific areas	• 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 use 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.

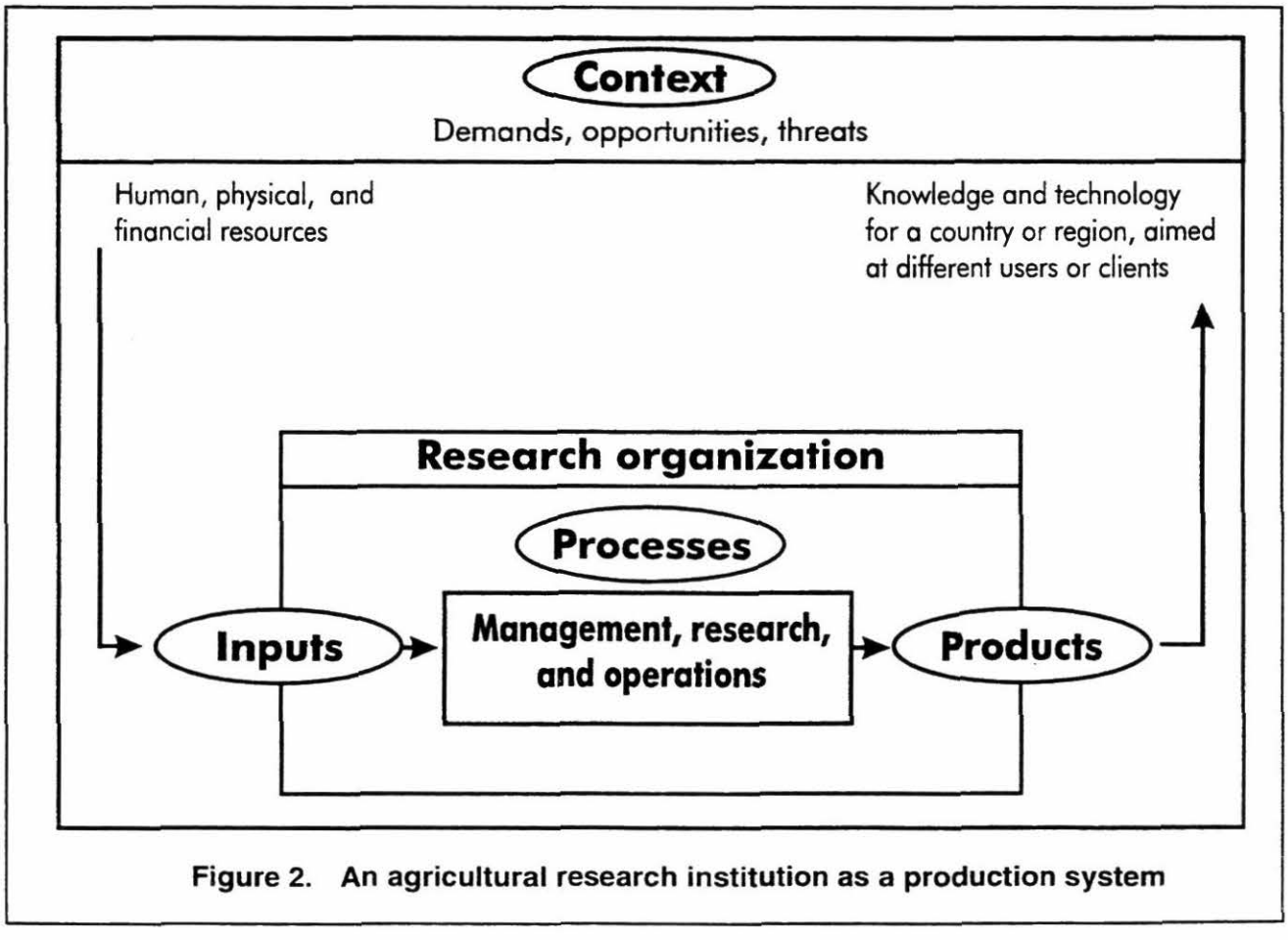


Figure 2. An agricultural research institution as a production system

Guidelines for the Exercises in Module 2

General theme

Planning for a national agricultural research institution in a changing world

Introduction

Throughout the module the participants will carry out a series of exercises that apply the concepts, methodologies, and tools developed during the course. There are three exercises, one at the end of each sequence.

Objectives

By the end of this series of exercises, the participants will have applied strategic planning methodologies presented in the different sequences at two levels:

- In the formulation of a strategic plan for a national agricultural research institution, in the context of rapid economic change
- In the formulation of a strategic plan for a new national biotechnology program, in an institution that faces low credibility and severe budget restrictions

Macropolicies

Participants should read the following case study carefully. Although the case is hypothetical, it brings up situations which are common to several countries in Latin America and the Caribbean. The case also shows common economic trends in relation to the agricultural sector. Of course, each institution's situation is different. However, the example poses several challenges that have come up at different institutions and is set up as an example that simulates reality

Change in macropolicies: A case study

The national government has had to change some of its policies. These changes mainly concern national finance, reducing the public expenditures and raising taxes creating an international by oriented economy, adjusting the tariff structure and the customs system, and following a philosophy of decentralization, giving more autonomy to regional authorities. The major objectives of these changes are to accelerate the rate of economic growth, reduce the fiscal deficit, slow down inflation, and lower the unemployment rate.

After two years, several of the macroeconomic goals are being reached. The economic growth rate is more than 5% and inflation is now less than 20%. Unemployment remains the same. Finally, the fiscal deficit remains

below than 1% of the gross domestic product. In other words, the new development model seems to be working.

The director of the National Planning Department has enough arguments to defend the macroeconomic management, saying that the stability of prices benefits the whole country. By rationalizing the official expenditure, the State can take care of social needs.

Impact on the agricultural sector. The agricultural sector is among the most directly affected. By opening the country to imports food and raw materials are brought in at lower prices, reducing the profit for the local producers. Agricultural credit, although now more readily available, costs more, and the interest rates are no longer subsidized. The State that intervened in the agricultural market now limits its actions to very serious situations such as natural disasters.

Socioeconomic indicators of the agricultural sector show a crisis. The planted area has been reduced substantially, unemployment in rural areas has risen, real and current prices to the producer have dropped, and total investment is almost zero. In short, the agricultural sector's role in the new development model appears to be marginal, in contrast with its previous leading role.

Agricultural union leaders, headed by the president of the National Association of Agricultural Producers, severely criticize this new marginal role and they demand preferential treatment, as in many developed countries. They argue that international markets for food and agricultural raw materials are totally distorted by the subsidies and disloyal commercial practices of the economic powers.

On the other hand, the industrial sector, who consume the agricultural raw materials, support the government. This group argues that by lowering prices for raw materials, they have increased their competitiveness giving them the chance to export and generate employment.

The Ministry of Agriculture faces two great, but contradictory challenges: the modernization of the agricultural sector, especially the small-farmer subsector, and the preservation of natural resources. The reconciliation of these two objectives lies in development of appropriate technology.

Impact in the national sectoral institutions. National institutions face severe budget cuts, and have had to reduce their size. Several of them have had to lay off highly specialized staff. In general, the existence of national institutions is threatened by new private organizations, which are apparently more efficient and better able to identify their clientele.

In particular, the National Agricultural Research Institution, which had already been losing credibility with the producers, barely has enough budget to cover operating costs. The main objectives of the Director General are to increase budget, diversify sources of funding, and improve credibility by initiating new research programs that will give the institution a competitive advantage in the sector. Biotechnology, especially genetic engineering, seems to have great potential. However, the traditional plant breeders, who are very important within the institution, argue that the dispersion of resources diminishes the chance of success.

The new science and technology law, promoted by the Congress in its efforts to modernize State management, stipulates that the National Agricultural Research Institution must negotiate both with the public entities, such as the National Treasury, and the users of its products and services, to obtain the necessary funding for its operation and development. The law states that the State may not support more than 20% of the institution's budget. That money must be used for social projects such as helping small farmers without land.

Exercise 1.1 Critical Planning Factors

Guidelines for the Instructor

Objective

✔ Evaluate the interests and needs of different social groups that make up the clientele of a national agricultural research institution.

Required materials

- Introduction to the exercises in module 2
- Letter of invitation to the forum participants
- An agenda for each member of the forum
- Tool for registering the critical external factors

Structure of the exercise

Given the case study presented in the introduction to the exercises in module 2, the Director General of the National Research Institution has invited a group of prominent nationals, representatives of the groups and entities already mentioned, and two representatives of the researchers, one from the social sciences department and the other from basic sciences. The open forum will attempt to clarify two main themes:

- The parameters that should be taken into account when planning to achieve objectives of funding and credibility
- The parameters that should be taken into account when planning for a national biotechnology program

Instructions

Organize a forum with "guests," choose participants to represent the following people:

- The Viceminister of Agriculture
- The Director of the National Research Institution
- The proponent of the new science and technology law
- The representative of the national association of agricultural producers
- The representative of the industries that process raw materials
- The representative of the social sciences from the NARI
- The representative of the basic sciences from the NARI
- A forum secretary from the NARI

Each of these "actors" receives the forum guide and the agenda for his role during the forum. No actor should see the agenda of any of the other actors.

You will act as moderator of the forum, assuring that:

- Each actor gives a five-minute presentation based on the arguments given below. This is followed by a general discussion of twenty minutes in which the "actors" interact with the audience
- The secretary presents the conclusions, based on worksheet No. 1
- The secretary distributes the conclusions of the forum to all participants

Suggested time for the exercise

This 60 minute exercise is divided up as follows:

- individual presentations: 35 minutes
- plenary discussion: 20 minutes
- secretary's summary: 5 minutes

The arguments

These are the arguments that the participants of the forum should support:

Viceminister of Agriculture. You should insist on the impossibility of reversing the modernization process of the State, and therefore in the impossibility of preferential treatment of the agricultural sector. The objectives of the government are to maintain the level of food prices, to favor the lowest-income consumers, and to preserve the natural resources for future generations.

Director of the National Research Institution. Your objective is mainly political: to guarantee the survival and strengthening of your institution during this period of change. To achieve this, you will argue the need for more financial and human resources and a broader range of activities, especially emphasizing the urgency to increase the search for promising germplasm.

Proponent of the new law. You are convinced that the National Agricultural Research Institution does not function properly. It is overly bureaucratic and it focuses on research that is irrelevant to the producers. You want the private sector to assume greater responsibility in research and transfer of technology.

Representative of the National Association of Producers. You insist that the government must maintain the protection of the sector. You argue that research should be funded by the State, and that it should be applied research. Research should concentrate on traditional products, and try to reduce production costs and improve competitiveness. You also argue that preserving natural resources imposes an additional expense on production.

Representative of industries that process raw materials. You argue that imported raw materials are cheaper and are more readily available. This has improved your competitiveness and broadened your markets nationally and internationally. You think that research and resource conservation are a social problem, to be funded by the State. Consequently, you think the national research institution should be reduced in size.

Representative of the social-sciences. You feel that agricultural research has been biased against the small farmers and has promoted indiscriminate use of natural resources. You think the institution should abandon its traditional research areas including research on improved varieties, which requires intensive use of agrochemicals. Agricultural research should reorient its objectives towards applied research, such as integrated systems of production based on resources available in small farms.

Representative of the basic sciences. You argue that the traditional model of plant breeding, based on crossing varieties available in the gene bank, should be complemented with work in biotechnology, especially in genetic engineering, in order to broaden sources of variety. You recognize that this calls for additional funds for research, so you recommend that activities of technology transfer and extension and sanitary control be passed to other governmental institutions.

Exercise 1.1 Critical Planning Factors

Participant's Guidelines

1. In the letter that you received earlier, you will find the specific directions for participating in the forum.
2. Prepare a five-minute presentation that summarizes the position of the group or entity you represent.
3. In your presentation, emphasize the interests of those you represent, and the need to guarantee their survival in this period of change.
4. During the discussion, that follows the presentations pay attention to the advantages and disadvantages that may present themselves for those you represent, with respect to management of the national research institution, and in particular the new national biotechnology program.
5. Based on the previous point, either support or contradict the conclusions of the forum.
6. As far as possible, be insistent in your points of view, but maintain some flexibility.

The following pages contain the formats for the letters to be given to the participants who will play the roles of the forum guests. The content of the letter will guide the person in his/her role.

Exercise 1.1 Critical Planning Factors

Letter of Invitation to the Forum Participants

1. Agenda for the Viceminister of Agriculture

City and date

Dr. (Mr. or Ms.)
Viceminister of Agriculture

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman for the Minister of Agriculture can make a significant contribution to the debate that we hope to carry out during this event.

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As Viceminister of Agriculture, you should insist on the impossibility of reversing the modernization process of the State, and therefore in the impossibility of preferential treatment of the agricultural sector. The objectives of the governments are to maintain the level of food prices, to favor the lowest-income consumers, and to preserve the natural resources for future generations.

We wish you success in your presentation.

Yours sincerely,

Instructor

2. Agenda for the NARI-National Director

City and date

Dr. (Mr. or Ms.)
National Director
Research Institution

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman for the Director General of the Agricultural Research Institution can make a significant contribution to the debate that we hope to carry out during this event.

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As a director of the national research institution, your objective is mainly political: to guarantee the survival and strengthening of your institution during this period of change. To achieve this, you will argue the need for more financial and human resources and a broader range of activities, especially emphasizing the urgency to increase the search for promising germplasm.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

3. Agenda for the Law Proponent

City and date

Dr. (Mr. or Ms.)
Proponent of the New Science and Technology Law

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman of the Honorable Representative Proponent of the Science and Technology Law can make a significant contribution to the debate that we hope to carry out during this event .

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As the proponent of the new law, you are convinced that the National Agricultural Research Institution does not function properly. It is overly bureaucratic and it focuses on research that is irrelevant to the producers. You want the private sector to assume greater responsibility in research and transfer of technology.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

4. Agenda for the representative of producers

City and date

Dr. (Mr. or Ms.)

Representative of the National
Association of Agricultural Producers

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman of the representative of the agricultural producers can make a significant contribution to the debate that we hope to carry out during this event.

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As representative of the National Association of Producers, you insist that the government must maintain the protection of the sector. You argue that research should be funded by the State, and that it should be applied research. Research should concentrate on traditional products, and try to reduce production costs and improve competitiveness. You also argue that preserving natural resources imposes an additional expense on production.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

5. Agenda for the representative of the industrial sector

City and date

Dr. (Mr. or Ms.)
Representative of the Industries
Processing of Raw Materials

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman for the representative of the industries processing raw materials can make a significant contribution to the debate that we hope to carry out during this event.

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As representative of industries that process raw materials, you argue that imported raw materials are cheaper and are more readily available. This has improved your competitiveness and broadened your markets nationally and internationally. You think that research and resource conservation are a social problem, to be funded by the State. Consequently, you think the national research institution should be reduced in size.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

6. Agenda for the social scientist

City and date

Dr. (Mr. or Ms.)
Representative of the researchers
of the social sciences

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman for the social science department can make a significant contribution to the debate that we hope to carry out during this event..

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As the representative of the social-sciences, you feel that agricultural research has been biased against the small farmers and has promoted indiscriminate use of natural resources. You think the institution should abandon its traditional research areas including research on improved varieties, which requires intensive use of agrochemicals. Agricultural research should reorient its objectives towards applied research, such as integrated systems of production based on resources available in small farms.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

7. Agenda for the basic sciences representative

City and date

Dr. (Mr. or Ms.)
Representative of the
researchers of basic sciences
Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that the spokesman of the group of basic scientists of the Institute can make a significant contribution to the debate that we hope to carry out during this event.

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

In order to have a dynamic discussion, we suggest that you prepare your presentation with the following points in mind:

As the representative of the basic sciences, you argue that the traditional model of plant breeding, based on crossing varieties available in the gene bank, should be complemented with work in biotechnology, especially in genetic engineering, in order to broaden sources of variety. You recognize that this calls for additional funds for research, so you recommend that activities of technology transference and extension and sanitary control be passed to other governmental institutions.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

8. Agenda for the forum secretary

City and date

Dr. (Mr. or Ms.)
Secretary of the forum

Dear Dr. (Mr. or Ms):

The organizers of the forum "Planning for a National Research Institution in a changing world" believe that you can suitably summarize the different arguments and conclusions of the members.

The forum has a double objective:

a. Analyze the parameters to be considered in planning for the agricultural research institution. The institution seeks to increase its credibility and its needs to obtain the necessary funding for its programs.
b. Clarify the parameters to be considered in planning its national biotechnology program .

We would like you to prepare a summary of the forum presentations and the following discussion based on the worksheets that the instructor will give you.

On worksheets 1 and 2, you should list in order of hierarchy the critical factors presented by the members of the forum, with the respective justifications they give, both for planning on an institutional level and planning for the national biotechnology program.

When the forum is over, you will have five minutes to present the summary to all the members of the group.

We wish you success in your presentation.

Yours sincerely,

_____

Instructor

Exercise 1.1 Critical Planning Factors

Worksheet 1

Planning a biotechnology program

Critical external factors (in order of importance)	Explanation/justification
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Exercise 1.1 Critical Planning Factors

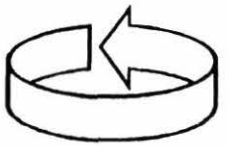
Worksheet 2

Institutional planning

Critical external factors (in order of importance)	Explanation/justification
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Exercise 1.1 Critical Planning Factors

Feedback 1



Planning a biotechnology program

Critical external factors (in order of importance)	Explanation/justification
1. No group of people to form a critical mass.	It is necessary to educate the scientists through a continuing education program.
2. Opposition from the traditional programs	It is necessary to increase the institution's awareness of the benefits a biotechnology program could bring to the other programs.
3. The needed investment in infrastructure is too high.	Include an extra section in the budget. Management and donors should understand the strategic importance of this investment.
4. The general objectives of the program are not clearly defined.	The program must identify its clientele and needs. Research "per se" does not make sense.

Exercise 1.1 Critical Planning Factors

Feedback 2

Institutional planning

Critical external factors (in order of importance)	Explanation/justification
1. Change in the economic development model.	Food self-sufficiency no longer an objective. Development of international marketing is the priority.
2. Decentralization and the new role of the State.	The provinces need more autonomy for setting research priorities. The private sector must participate actively in research and technology transfer.
3. Lack of infrastructure that would promote competition.	The producers demand that the concept of competition be more comprehensive than that of productivity. Therefore, there should be other investments to complement those of research and transfer.
4. Improvement of the productive units.	On the farm level, improvements should be made such as, installing irrigation. Producers need credit for long-term investment at low interest rates.
5. Negative impact of the new development model on certain groups.	The social sciences demand a redistribution of the benefits of economic growth, through direct aid from the State to certain groups. The environmentalists foresee a deterioration in the natural resources.

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.

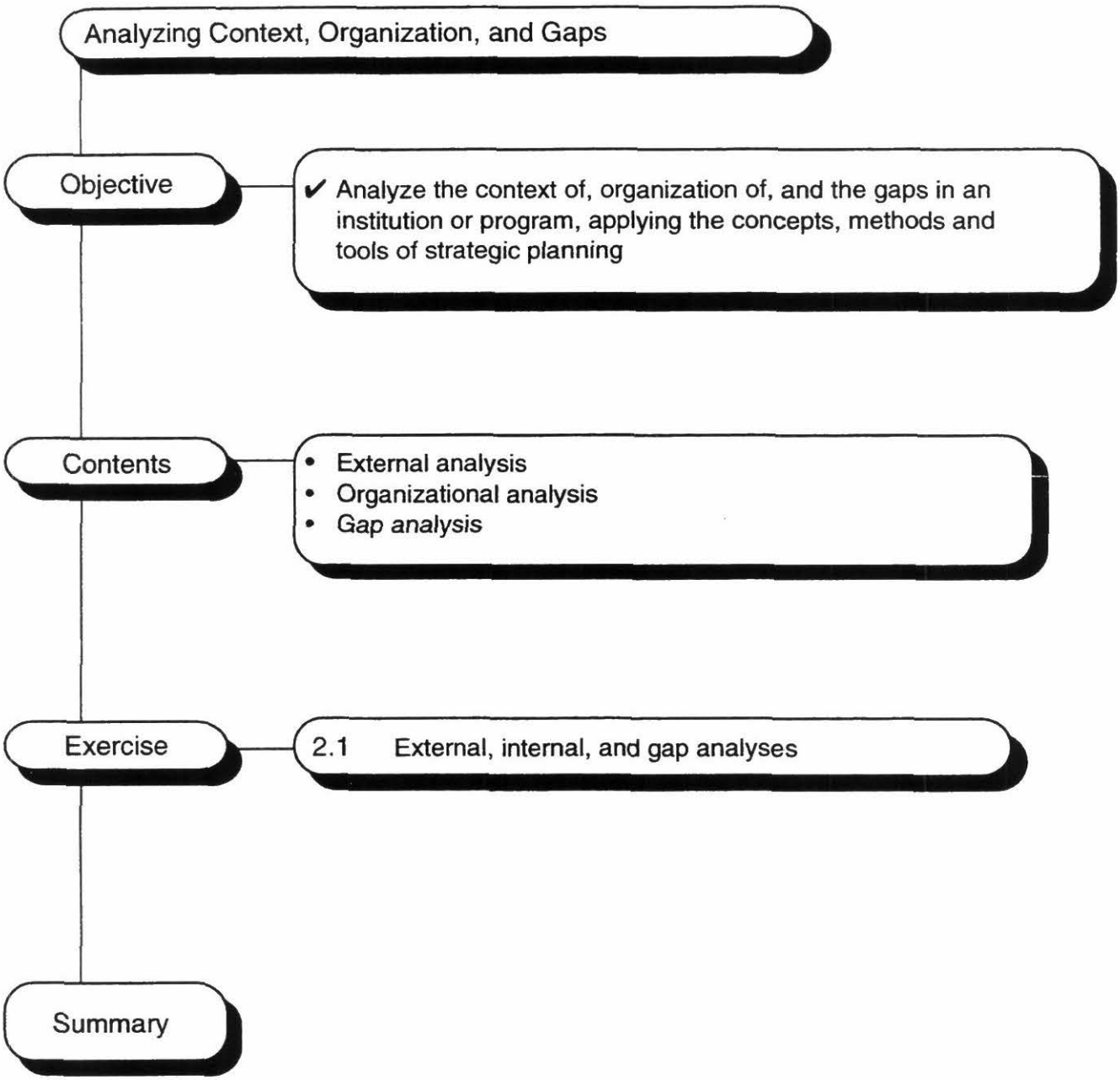
The characterization of the different types of planning in relation to the different decision-making levels of an organization was emphasized. The Sequence continued with an explanation of the importance of the political dimension of planning, and the "strategic intention" of top management. The existence 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).

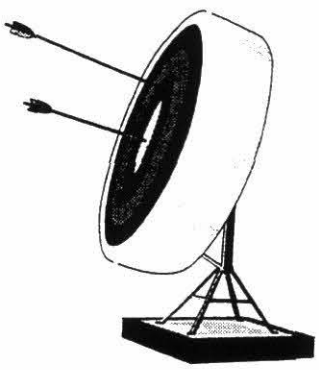
The Sequence closed with a simulation exercise. The results shall be used in exercises of Sequences 2 and 3. A hypothetical NARI holds a meeting with representatives of stakeholders. The representatives present their demands and discuss and explain the difficulties and possibilities for their meeting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

Sequence 2. Analyzing Context, Organization, and Gaps

Flowchart for Sequence 2



Objective for Sequence 2



By the end of this sequence, the participants will be able to

✔ Analyze the context of, organization of, and the gaps in an institution or program, applying the concepts, methods and tools of strategic planning

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 4.

Table 4. 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 5 shows a chart for recording the main elements that characterize the relevant external environment of an institution or program.

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 6 facilitates the recording of the most of the critical factors (in order of importance).

Table 5. 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 dimensionl	
• technological dimension	
Operational external environment	
• clients	
• users	
• partners	
• competitors	

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.

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 7 helps committee members to record the key sources of information for each critical external factor.

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 8 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.

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).

Table 6. 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.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

Table 7. Chart 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.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

Table 8. Chart for recording the trends of the critical external factors

Critical external factors	Trends	S	M	L
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

To fill out Table 9, 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 9. 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.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

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."

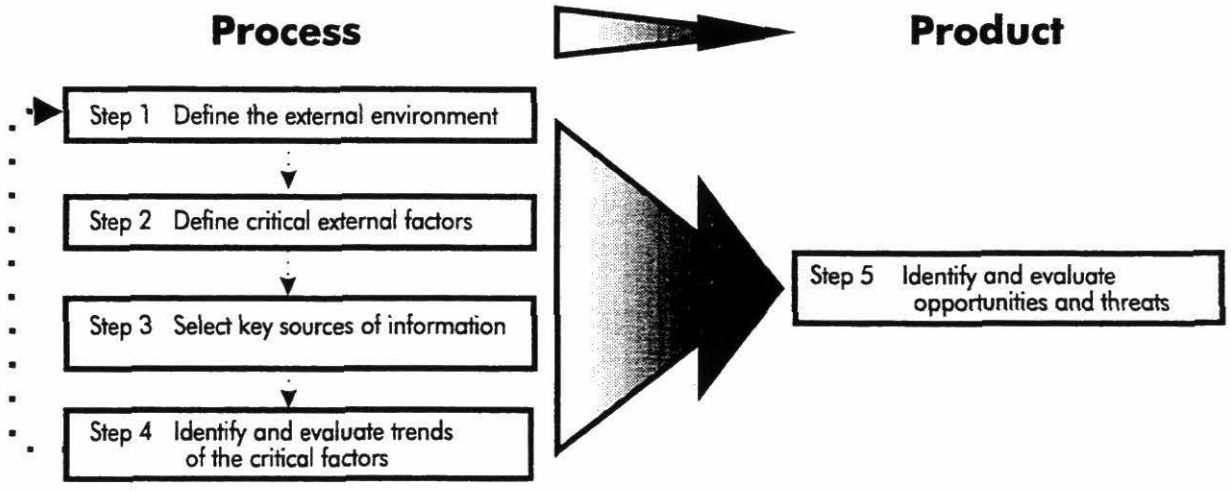


Figure 3. Steps in external analysis

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 Processes

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.

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.*

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. 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*

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 10).

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 10. 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 11, is a guide for gathering information about organizational weaknesses.

Table 11. Identifying organizational weaknesses in relation to the external environment

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

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.

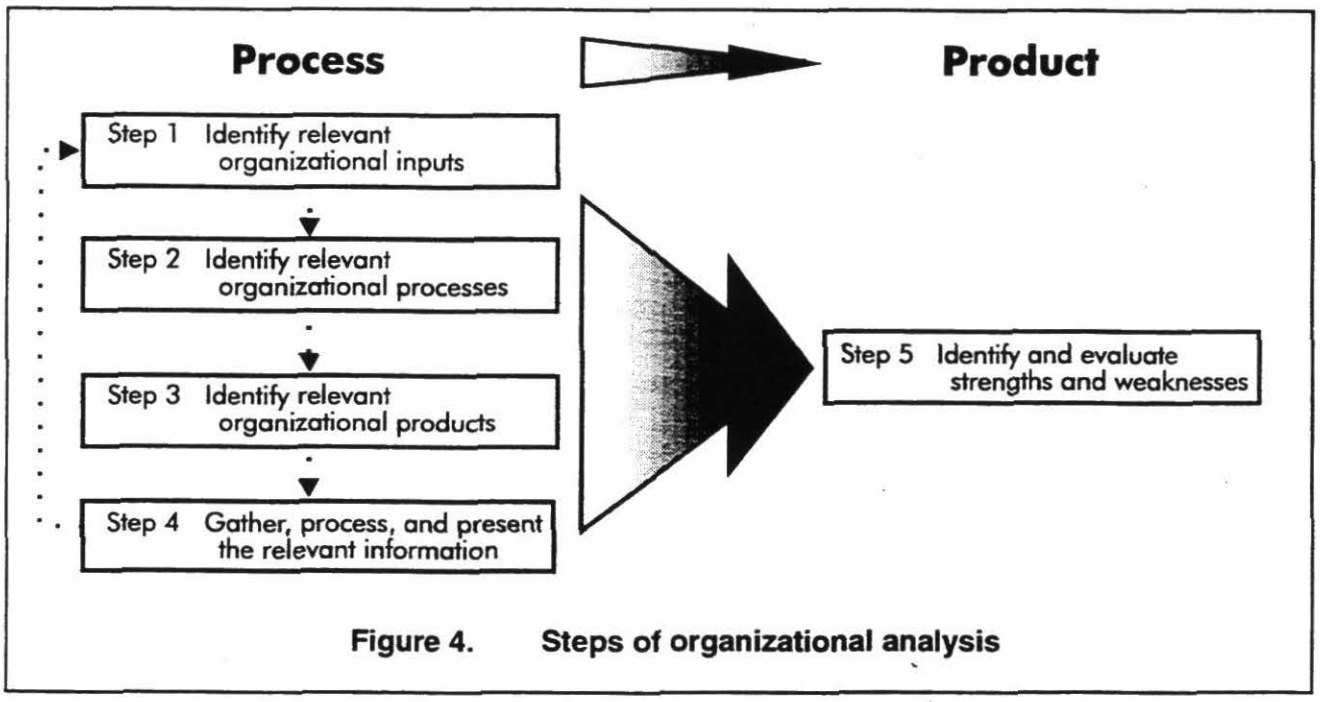


Figure 4. Steps of organizational analysis

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 and Analysis

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.*

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 implementating 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 is 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 12 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 12. 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.

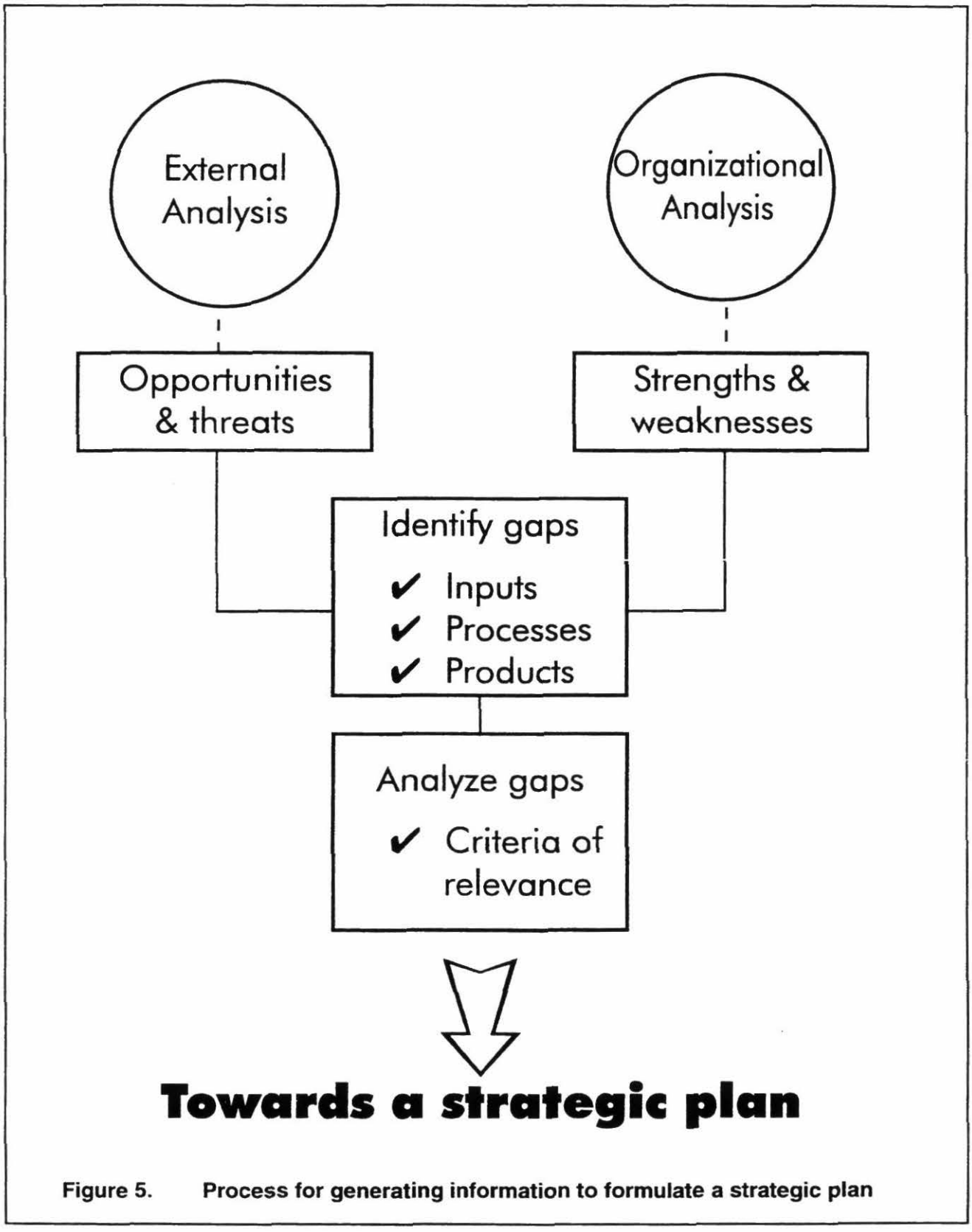


Figure 5. Process for generating information to formulate a strategic plan

Exercise 2.1 External, Internal, and Gap Analyses

Guidelines for the Instructor

Each group will meet for 60 minutes, with the following objectives:

Objectives

- ✔ Carry out an external analysis of the external environment.
- ✔ Carry out an internal analysis of the institution.
- ✔ Identify and categorize the gaps.

Required materials

- Worksheet for identifying opportunities and threats
- Worksheet for identifying strengths and weaknesses
- Worksheet for identifying gaps

Methodology

After the forum of exercise 1.1, the "Director General" of the institute organizes four work groups. Two will be responsible for presenting the basic guidelines for planning that will help to achieve the objectives of credibility and budgeting required to carry out the institute's mission and objectives. The other groups will be responsible for suggesting how to structure a national biotechnology program, clearly identifying the resources needed, the products to be generated, and their use. The Director General hopes that groups will recommend how the new program should be incorporated into the existing structure of the institution.

This exercise is related to exercise 1.1, and its results can be used to carry out the three types of analysis.

- Organize four work groups, (named 1, 2, 3, and 4).
- Groups 1 and 2 concentrate on identifying institutional gaps.
- Groups 3 and 4 concentrate on identifying gaps at the level of a national biotechnology program.
- In a plenary session, explain the guidelines to the work groups.
- Give each group the format for identifying, analyzing and priority setting for gaps (Table 12).

Suggested time for this exercise

• Work groups	30 minutes
• Presentation of gaps in plenary session	20 minutes
• Discussion and feedback	10 minutes
Total:	60 minutes

Exercise 2.1 External, Internal, and Gap Analyses

Participant's Guidelines

1. Each group appoints a coordinator and a rapporteur.

2. Each coordinator defines the work assigned to the group.
   - Identifying the gaps for the national institution; or
   - Identifying the gaps for the national biotechnology program.

3. During the plenary session, each group will present, for five minutes, the two most important gaps identified during the exercise, using the format for the identification and analysis of gaps.

Exercise 2.1 External, Internal, and Gap Analyses

Worksheet 1 Identification of Opportunities and Threats

Critical factors	Trends	Opportunities	Threats
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Exercise 2.1 External, Internal, and Gap Analyses

Worksheet 2A Identification of Institutional Strengths in Relation to the External Enviromental

	Strengths that help to take advantage of opportunities	Strengths that protect from threats
A. Inputs 1. 2. 3.		
B. Processes 1. 2. 3.		
C. Products 1. 2. 3.		

Exercise 2.1 External, Internal, and Gap Analyses

Worksheet 2B Identification of *Institutional Weaknesses in Relation to* the External Environment

	Weaknesses that prevent taking advantage of opportunities	Weaknesses that do not protect from threats
A. Inputs 1. 2. 3.		
B. Processes 1. 2. 3.		
C. Products 1. 2. 3.		

Exercise 2.1 External, Internal, and Gap Analyses

Worksheet 3

1. **Description** (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.

Exercise 2.1 External, Internal, and Gap Analyses

Feedback 1
Identification of Opportunities and Threats

Critical factors	Trends	Opportunities	Threats
1. *State funding*	*Dropping in percentage*	Donors' offers for new areas lines of research	
2. Private sector	Assumes role of financier and executor		Lower funding, competing for human resources
3. Research model	No new contributions to traditional plant breeding	Opening new areas of research	
4. Scientists and researchers	Outdated techniques and knowledge		Lack of appropriate human resources

Exercise 2.1 External, Internal, and Gap Analyses

Feedback 2A
Identification of Institutional Strengths in Relation to the External Environment

	Strengths that help to take advantage of opportunities	Strengths that protect from threats
A. Inputs 1. Infrastructure		All investments are complementary, the private sector would have to begin from almost nothing
B. Processes 1 . Research Model	Biotechnology can create new inputs for traditional plant breeding, eg. new gene combinations	
C. Products 1. Sustainability		This technology is a "public good" that the private sector will not want to fund.
2. Technologies	Private people, for specific groups, such as small farmers	

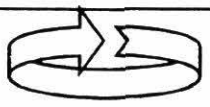
Exercise 2.1 External, Internal, and Gap Analyses

Feedback 2B Identification of Institutional Weaknesses in Relation to the External Environment

	Weaknesses that prevent taking advantage of opportunities	Weaknesses that do not protect from threats
A. Inputs 1. Human resources	A new generation of high-quality researchers is lacking	
B. Processes 1. Centralization		At the regional level, competitors emerge who have more clearly defined the clientele and their needs
C. Products 1. Varieties	They do not incorporate achievements in other disciplines, such as biotechnology	
2. Technologies		They are not developed in a participatory way with the producers

Exercise 2.1 External, Internal, and Gap Analyses

Feedback 3



1. **Description (A)** *Training program to bring scientists and researchers up-to-date and make them more aware of new research techniques and disciplines*

   _____

   _____

2. **Classification (B)**
   - Input: X
   - 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: X

4. **Type of risk faced (D)**
   - Present institutional sustainability: X
   - Adaption to future environmental conditions: ____
   - Changes in the institutional environment (innovation): ____

5. **Demand of institutional resources (E)**

	low	medium	high
Financial	____	____	X
Human	____	X	____
Infraestructure	____	____	____
Others _____			

6. **Possibilities of external negotiation (F)**
   - High: X
   - 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.

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

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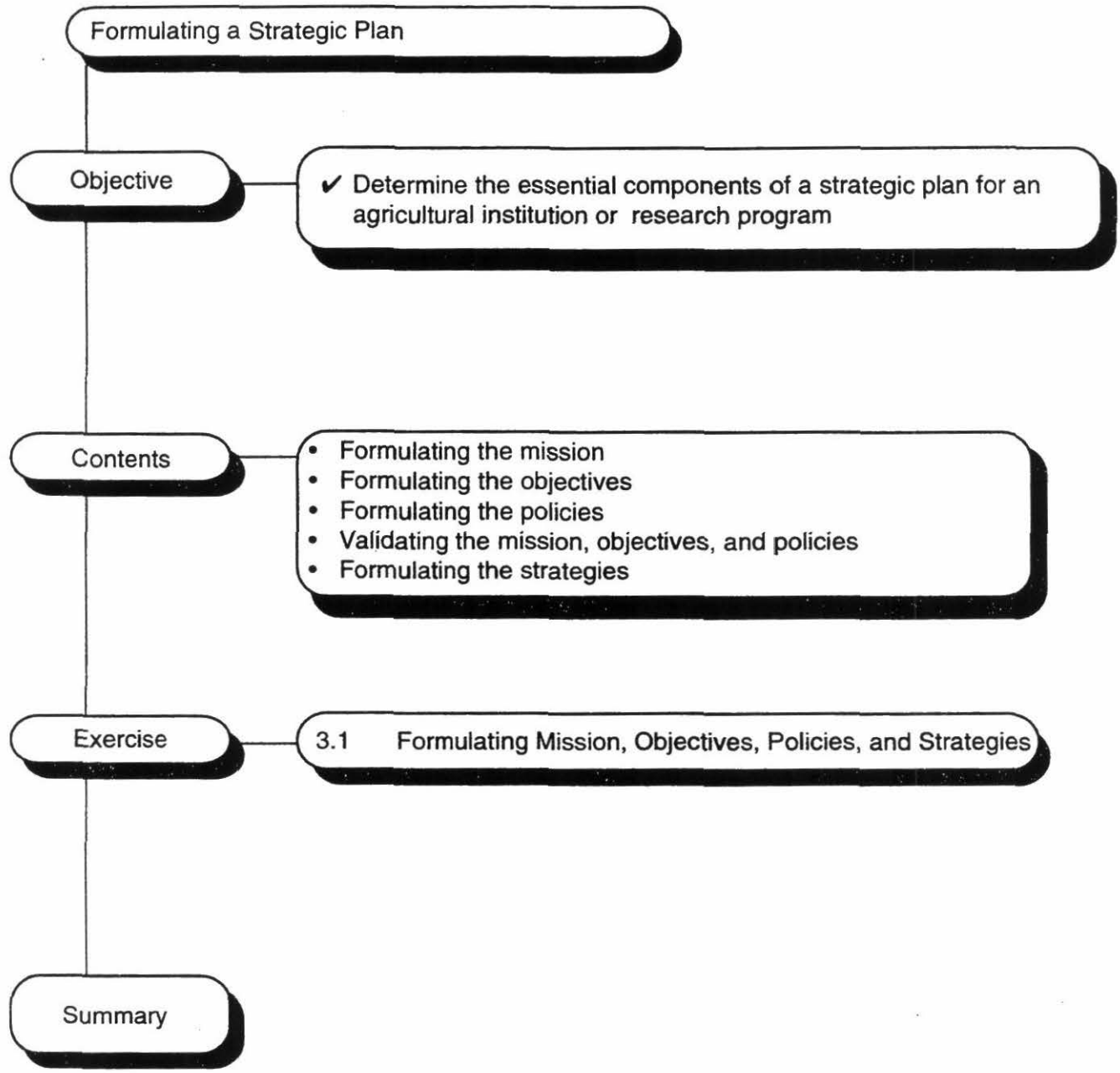
Sequence 3. Formulating a Strategic Plan

Flowchart for Sequence 3



Objective of Sequence 3

By the end of this sequence, the participants should be able to:

✔ Determine the essential components of a strategic plan for an agricultural institution or research program.

Introduction

Every strategic planning process requires the existence of a central coordinating committee. Also, it is important that this process be geared to the preparation of a final product: a "strategic plan."

This Module is designed to give the participants an opportunity to use the concepts, methods and tools necessary to formulate a strategic plan for an institution or program.

Sequence 1 outlined the main elements and characteristics of the strategic approach. Sequence 2 was devoted to elements of the strategic approach which facilitate the analysis of the external environment, and help identify external opportunities and threats; the organizational analysis, which identifies internal strengths and weaknesses; and the "gap analysis," which develops strategies to overcome the weaknesses. All the results of these analyses are inputs for supporting and guiding the formulation of the central part of the strategic plan: mission, objectives, policies, and strategies. The context of the information for formulating this plan was given in exercise 1.1.

Sequence 3 will formulate the central part of the strategic plan. This Sequence lists five components:

- Formulating the mission
- Formulating the objectives
- Formulating the policies
- Validating the mission, objectives, and policies
- Formulating strategies

Figure 6 shows the substantive logic of Sequence 3, describing the three general steps to formulate the plan.

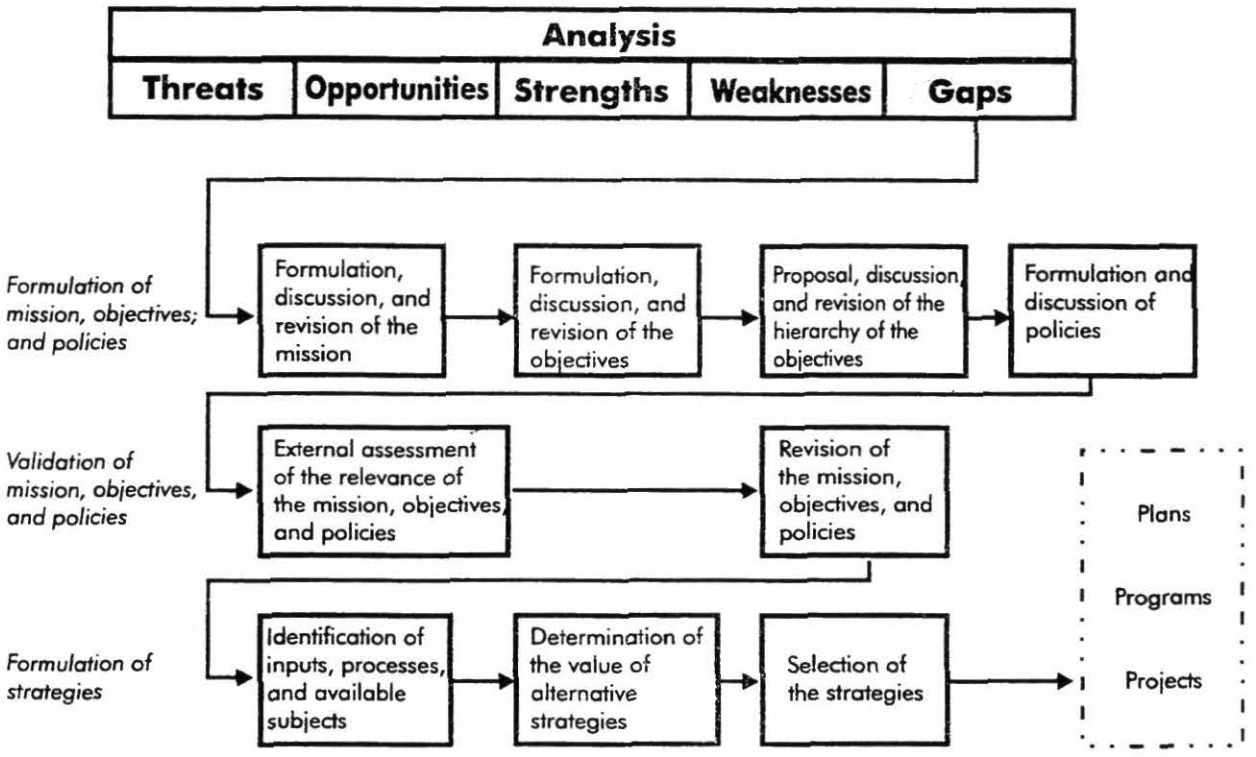


Figure 6. Steps for the formulation of the mission, objectives, policies and strategies

Formulating the Mission

What is our business? We rarely ask ourselves this question, or reflect on the most appropiate answer.

What is our business? We rarely ask ourselves this question in relation to our institutions. We dedicate even less time to an adequate reflection that would help find an answer to this question. In private industry, this has been one of the major causes of failure. In public organizations, it is one of the factors that explains loss of credibility, which in turn jeopardizes institutional sustainability.

We cannot exaggerate the importance for an institution to formulate, clearly, precisely, and explicitly its mission and to make it known within and outside the organization. But before formulating the mission, the top and middle management should be convinced of the reasons for doing so, and should agree on the meaning of the mission.

Concepts

What is an institution's mission? Why must an institution formulate its mission clearly, precisely, and explicitly?

A mission statement is a short description of the main purpose, the final goal, and its most comprehensive justification. It should include information that will guide the organizational behavior and the direction the institution takes. A well-formulated mission communicates values that motivate and guide. It gives the impression that the institution is successful, that it knows where it is going, and that it deserves support, time, and investment.

In its widest sense, the mission is the purpose of an institution. There are several reasons for concentrating efforts on fomulating the mission. David (1988), Rue & Holland (1989), Oliveira (1992), have given various definitions of the mission:

- It communicates unanimity about the purpose of the organization, avoiding contradictions and conflicts.
- It gives a logical general base for the allocation of resources.
- It is the most appropriate reference (perhaps the only one) for working out an adequate formulation of general objectives, policies, and strategies, which should be consistent among themselves and with the mission.
- It guides human resources and other organizational resources in a certain direction, reducing the costly, counterproductive fragmentation that occurs in the absence of an explicit mission, or when it has been vaguely formulated.

- It provides the base for other sub-units to formulate their own specific missions consistent with the general mission. Objectives and goals are linked to the organizational structures and processes. An institution's general mission should serve as the broadest reference for defining missions and general purposes of its centers, programs and projects.
- It helps to establish an organizational climate that can attract and motivate people involved, both internally and externally.

Besides understanding the basic reasons for formulating the institution's mission, top and middle management should agree on the philosophical and political meaning of the mission.

A mission (a) defines the organization and what it hopes to be; (b) is specific enough to exclude certain activities and comprehensive enough to allow creative growth; (c) distinguishes its institution from all the other organizations in the same field of activities; (d) serves as the most logical frame of reference for guiding the general assessment of present and future institutional activities; (e) defines the space and path to which the main resources, principles, values, expectations, responsibilities, and creative efforts will be committed; and (f) is formulated in such clear terms that all internal and external relevant actors can understand it (David, 1988; Oliveira, 1992).

The mission does not express concrete goals. It provides motivation, general direction, image, and a philosophy that serve as guides to develop the organization. Public institutions should mainly formulate "open missions" that establish generic satisfaction in the external environment without necessarily indicating specifically the products/services to be offered. This would reduce or impede future actions in case of changes in the external environment (David, 1988).

In conclusion, a mission statement is a short statement of the major purpose, of the most comprehensive reason justifying the existence of an institution. Its formulation should include enough information to guide the organizational behavior and provide direction at all levels. But only the collective exercise of formulating a mission will improve (a) understanding its importance, and (b) understanding of its meaning.

Examples

The new mission of EMBRAPA (the Brazilian Corporation for Agricultural Research), after a recent strategic planning exercise, is to "generate, promote, and transfer knowledge and technology for sustainable development of agriculture, agroindustry, and forestry, for the benefit of Brazilian society" (Borges-Andrade and Horton, 1994).

This new mission reflects the profound search for a new development model that is participatory, democratic, and sustainable. It is also a result of a search for new sources of funding because of the reduction of government funds in the organization's budget.

The desire to diversify clientele and users is evident in the mission of EMBRAPA. It acknowledges the reduction of the role of purely agricultural research in a society in which the agricultural sector is closely related to other chains of production.

The description of the mission needs a certain degree of flexibility to follow changes in the context. The case of the mission defined by CENICAFE (Centro Nacional de Investigaciones del Café), in Colombia, is an excellent example of this.

CENICAFE's mission is to "generate, adapt, and transfer scientific knowledge and technology, according to the need of the coffee growers, in the areas of natural resources, production, harvesting, postharvest and processing, in order to assure sustainability of production, increase productivity, preserve and improve quality and competitive capacity of coffee and other products of the coffee-growing zone" (Posada, 1994). The major challenge for CENICAFE is to: "provide producers with technologies that allow them to cope with the drastic reduction of international prices and/or find alternatives that give at least an equal profit" (Posada, 1994).

CENICAFE's mission aims at transforming a threat into an opportunity, by diversifying business areas.

According to Collion (1989), the mission of a national agricultural research institute can be, to:

- Support the development of the agricultural sector of the country, or
- Contribute to the progress of agricultural science, or
- Serve to formulate policies.

EMBRAPA and CENICAFE do not mention rural extension as part of their mandate. But INTA (Instituto Nacional de Tecnología Agropecuaria) in Argentina, has responsibilities both in research and in agricultural and livestock extension. Its mission is to: "impel and envigorate research and agricultural and livestock extension in order to accelerate the spread of technology and the improvement of agricultural business and rural life" (Hogg, 1994).

Missions can be defined at the institute, center, and program levels. For example, the mission of the Agricultural Research Unit of Canada

(equivalent to a NARI), is to "improve the long-term competence of the Canadian agro-food sector through the development and transfer of new technologies." The Experimental Station of Lethbridge, the largest experimental station within the Research Unit, has as mission: "produce new technology and information to aid in the development of more competitive and sustainable systems for dryland and low irrigation in the prairies of southern Canada" (Ayres, 1993) (Figure 7).

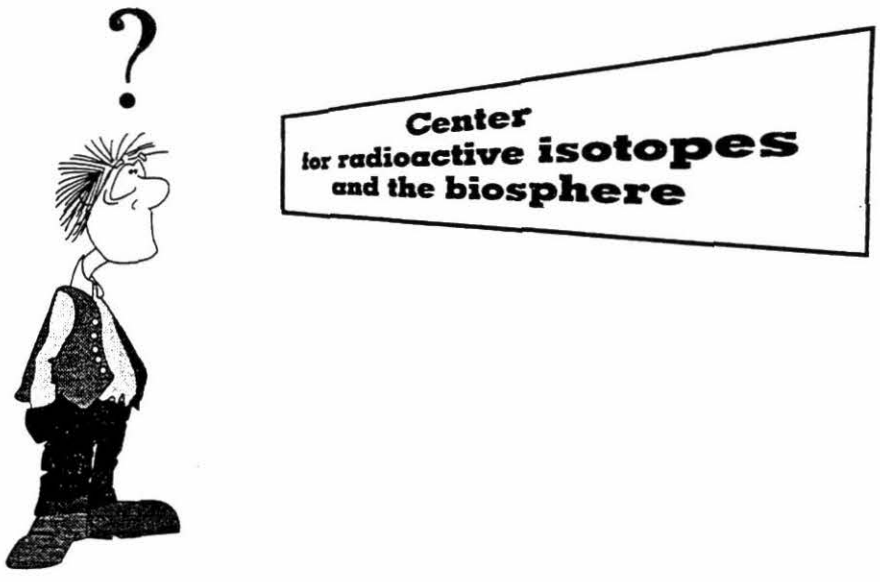


Figure 7. The name of an organization is not enough to express its wishes and communicate them to others. These needs to be statad in the mission.

Methodology

The literature on strategic planning, management, and administration reveals that there are no fixed techniques or recipes for formulating a mission. But all agree that there are some key components to the job. Table 13 looks at some aspects of formulating and assessing a mission according to the strategic approach, using some examples from Pfeiffer *et al*, 1985; David, 1988, Oliveira, 1992; Certo and Peter, 1993)

The matrix of Table 13 can be used to formulate and evaluate an institution's mission. To formulate a mission, use the same components and questions of Table 13, only substituting the word "organization" for the name of the institution or program, as the case may be. The answers to the questions should be written in the third column.

To evaluate an already-formulated mission of an institute or a program, identify the basic components and proceed in the same way. When an institution or program has no explicit mission statement (perhaps because it has not adopted the strategic approach), the most general objective should be regarded as the mission.

Eventually, one can identify which of the components of the mission statement were not found, and revise the mission and bring it up to date.

The matrix is just a tool to facilitate formulating or evaluating a mission. Based on the information in the third column, the mission statement can be formulated, and used, for example in corporate publications.

The elements presented in the example of Table 13 are the most relevant to be considered in formulating a mission for an institution. The final composition (see Table 14) does not necessarily have to include all the components in a single paragraph, because the paragraph may be too long and too complex. For greater clarity and to improve comprehension of the mission, the mission statement should consist of two parts: (a) an opening paragraph, which generally includes the purpose, the products, and the clients of the organization; and (b) the "body" of the statement, which expands on the opening. Top management must decide on the contents of the first paragraph, which is the most important, and on the statement as a whole.

Table 13. Matrix for formulating and assessing a mission

Components of a mission statement	Questions to answer in the mission statement	"Mission of the Future Valley Agricultural Research Center" (Hypothetical example)
• The major purpose, the basic reason for the organization's existence	What is the business of the organization?	Develop research to solve environmental, social, and economic problems of the agricultural and agroindustrial segments of Future Valley
• Products and services produced	What are the main (types of) products/services of the organization?	Technical-scientific knowledge and agricultural technology appropriate for dryland and irrigation areas
• Clients	Who are the relevant clients and where are they?	• Small and medium farmers of dryland areas • Farmers and agroindustries of the irrigation areas of Future Valley
• Technology	What are the organization's research approaches?	• Traditional biotechnology and technology for dryland areas • Biotechnology and other frontier technologies for irrigation areas
• Philosophy	What is the philosophic base (values, beliefs, and aspirations) of the organization?	• Valuing human resources in the organization • Clients and partners are the organization's guides • Interest in the internal market and technological competition in the country • Interest in the productivity, quality, profit, and health of the crops and their final products • Environmental factors as developmental factors, to be preserved and used rationally for the good of society • The center values the interchange and partnership with other local, state, regional, national, foreign, and international institutions
• Interest in the sustainability of the organization	What is the organization's attitude to its sustainability in the long run?	Clients and partners of the organization participate in: • choosing problems and challenges to be addressed by research • defining and assessing research policies and priorities • building the organization's future

Table 13. Continued

Components of a mission statement	Questions to answer in the mission statement	"Mission of the Future Valley Agricultural Research Center" (Hypothetical example)
• The organization's self-image	What are the key strengths and competitive advantages of the organization?	The most modern infrastructure of laboratories for research; the best human team in biotechnology; and adopting the "strategic approach" in management, because the center believes that "if you're not the biggest, you have to be the best.".
• Interest for building a positive public image	What is the public image that the organization would like to have?	The center as a technological pillar of the agricultural present and future of Future Valley
• Sources of inspiration	What key factors motivate and inspire the organization?	Committed to (a) sustainable development; (b) clients and partners of the center; and (c) human resources of the organization, in the long run

Table 14. Example of a mission statement

Agricultural Research Center of Future Valley **--mission statement--**
"The mission of the Future Valley Agricultural Research Center (FVARC) is to develop agricultural research activities to contribute to solving social, economic, and environmental problems of the agricultural and agroindustrial segments of Future Valley, through the continuous supply of technical-scientific knowledge and appropriate technologies, which permit a "qualitative jump" in the performance of the small and medium farmers of the dryland area and the farmers and agroindustrials of the irrigation area, so they can fully participate in the equitable and sustainable socio-economic development of the region and strengthen the competitiveness of the national economy." For the dryland area, FVARC will combine the potential of biotechnology with other appropriate technologies for agroecological and socio-economic characteristics of rain-fed agriculture. For the irrigation area, FVARC will combine the potential of biotechnology with other frontier technologies needed by the high level of technology of irrigation agriculture. The success of the FVARC mission will be based on: (a) the valuing and strategic development of its human resources; (b) the needs, challenges, and expectations of its clients and partners; (c) interest in the productivity, profitability, quality, and health of the crops and their products, which will contribute to supplying the internal market and to improving the competitiveness of the regional agriculture; (d) the understanding that environmental factors are important for development, and should be preserved and used rationally in the long run for the benefit of society; (e) the interchange with other relevant local, state (provincial), national, foreign, and international institutions. The FVARC will establish and maintain mechanisms that permit the direct participation of representatives of the different groups of its relevant clients and partners in the processes of (1) choosing problems and challenges to be addressed by research; (2) defining and evaluating policies and priorities for research; and (3) building future areas for research in the center. The Center is not the only, nor even the largest agricultural research institution in Future Valley. But FVARC has the most advanced infrastructure and laboratories for agricultural research and the researchers team in biotechnology in the region. Also, it has adopted the "strategic approach" to management and the development of agricultural research. This is because the Center believes that "if you're not the biggest, you have to be the best." But the Center recognizes that only the social, political, and financial support of its clients and partners can transform FVARC in the technological pillar of regional agriculture. In the long run, FVARC will be committed to: (a) the strategic development of its human resources; (b) the expectations of its clients and partners; and (c) the socio-economic sustainable development of Future Valley.

Formulating Objectives

Concepts

In the literature on planning, there is no uniform definition of an objective. Even in the literature on strategic planning, there is no consensus. (David, 1988; Oliveira, 1992; Certo and Peter, 1993). In the broadest sense an objective is the future state, situation, or result that somebody wants to achieve. In this Sequence, objectives will be defined in line with the strategic approach, which recommends that the objectives be defined in association with decision-making levels and the time horizon for achieving them. From this perspective, objectives may be divided into three categories:

"In the broadest sense, an objective is the future state, situation, or result that somebody wants to achieve"

Institutional objectives. These objectives should be: based on the institution's mission statement and on external, organizational, and gap analyses; strategic in nature; long-term; rather inflexible; and qualitative. They should serve as a reference for formulating institutional policies and strategies and of functional objectives. Top management is responsible for formulating and periodically updating them.

Functional objectives. These objectives should be: based on the institutional objectives; referring to the tactical level; medium-term; more flexible; and quantitative-probabilistic (define a probable situation, in terms of percentages or other measurable indicators, stating the desired minimum): They should serve as a reference for the formulation of the functional norms and tactics, and of the operational objectives. Middle management is responsible for formulating, monitoring, assessing, and bringing up to date the functional objectives.

Operational objectives. These objectives should be: derived from the functional objectives; referring to the operational level; short-term; highly flexible; and quantative-deterministic (precisely define a situation that should occur, in terms of percentages or other measurable indicators: They should serve as a reference for formulating the operational directives and activities, in the various administrative and technical units. Line managers are responsible for formulating, monitoring, assessing, and bringing up to date the operational objectives.

These three levels of objectives should be widely discussed by top, middle, and line management. Line managers should discuss them with those who will carry out the objectives. The level of interaction among the groups of relevant actors in the institution with respect to these three categories of objectives, determines the level of success in achieving the defined objectives.

Figure 8. A target is a good illustration of an objective, that is achievable through the mobilization of inputs and processes

Methodology

There is no a fixed rule or universal technique for formulating objectives. There are, however, some guidelines that may help in carrying out this task.

1. Maintain coherency between the mission and the institutional, functional, and operational objectives. The operational objectives are derived from the functional objectives, which are derived from the institutional objectives, which in turn are derived from the mission statement and from analyses of the external enviroment, the organization itself and its gaps.
2. Institutional objectives should be formulated by top management, which should derive them from the mission statement and from the external, organizational, and gap analyses.
3. Functional objectives should be formulated by middle management, which should derive them from the institutional objectives and from the external, organizational, and gap analyses.
4. The operational objectives should be formulated by line management, which should derive them directly and exclusively from the functional objectives and from the external, organizational, and gap analyses.

5. In each of the three categories, objectives should be formulated and listed in hierarchical order, (see Figure 9). To organize the objectives by hierarchy within a certain category, the members of the relevant committee must identify, by consensus, the interdependency among them. After making a list of the most relevant objectives, the members should answer individually and then as a group (to achieve consensus), two key questions for each of the objectives, to determine the interdependency between objectives:
   - Does this objective contribute to the achievement of other objectives?
   - On which objectives does fulfillment of this objective depend?

   The committee's answers should be organized in an "objective flowchart," in which the most comprehensive objective appears at the top. The rest of the general and specific objectives are organized in descending hierarchical order. The greatest number of objectives that contribute to the fulfillment of others appear at the bottom. The connecting arrows relate the lower objectives to those in higher levels. Each objective contributes to the achievement of the objectives above it.
6. As a principle of methodology, in the exercise for formulating institutional objectives, the mission should be considered the broadest objective. Beginning with the mission, top management will discuss what institutional objectives should be formulated in order to fulfill the mission of the institution. This means there must be as many general institutional objectives as necessary to include all the points of the mission. For each general objective, there should be as many specific institutional objectives as necessary to cover the corresponding general objective.
7. Once the general and specific institutional objectives are formulated, the functional objectives are formulated in the same manner. The difference is that those responsible for the different functions of the institution should first discuss and identify, which relevant functional objectives should be derived from the institutional objectives. They make a list of these objectives, to be implemented at the medium-term, to achieve the specific institutional objectives. Then in a work group, middle management will organize the objectives according to the different functions of the institution. Next, those with corresponding functions will put them in hierarchical order within each function. Each group will define the general functional objective to which the others contribute. There will be only one group of middle management, the managers of the overall functions of the institution. In the case of functional objectives for research, these will be organized by program.

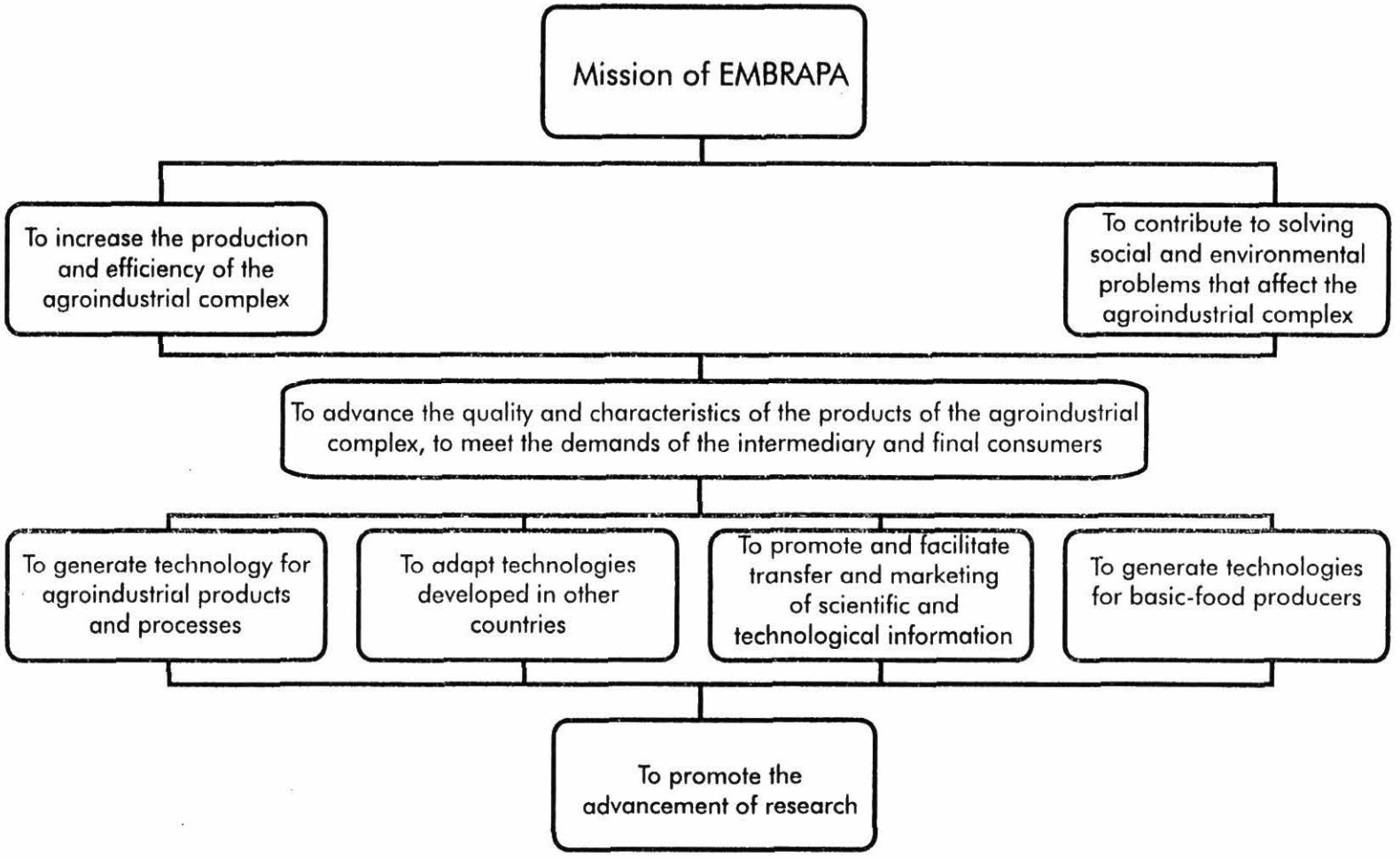


Figure 9. The objectives of EMBRAPA in hierarchical order (Johnson *et al.*, 1991)

8. Once the general and specific functional objectives are formulated, the operational objectives will be formulated following the same system. The difference is the actors who participate in the process. In this case, line management participates, as well as those under their command. The operational objectives should be formulated every year. This corresponds to the projects level.
9. The group, or committee, that coordinates the strategic planning process should organize and support all the strategic steps of the process. But each manager should be autonomous in carrying out the steps of the process in relation to the participation of those under his command.
10. The institutional objectives should be included in the strategic plan; the functional objectives in the tactical plan, and the operational objectives in the operational plan. The objectives of all three categories should be communicated to all employees, every year.

Relationship between management level, objectives, plan, and term			
Management level	**Objectives**	**Plan**	**Term**
Top	Institutional	Strategic	Long
Middle	Functional	Tactical	Medium
Operational	Operational	Operational	Short

Clearly formulated objectives provide direction; allow synergy for development; guide planning, monitoring, and evaluation; and support both resource allocation and the design of positions and their respective functions.

Formulating Policies

Concepts

A policy is not an action; but a guide to decisions and behavior intended to stimulate, support, or guide actions in a desired direction toward an objective. (Figure 10)

For example, if one of the policies of an institution is "the mixing of disciplines in agricultural research projects", this policy will influence and guide many other decisions at different levels and areas of the institution.

Policies can be classified according to their scope, the way of making them known, their origin, their objectives, the decision-making levels at which they are formulated, and their nature:

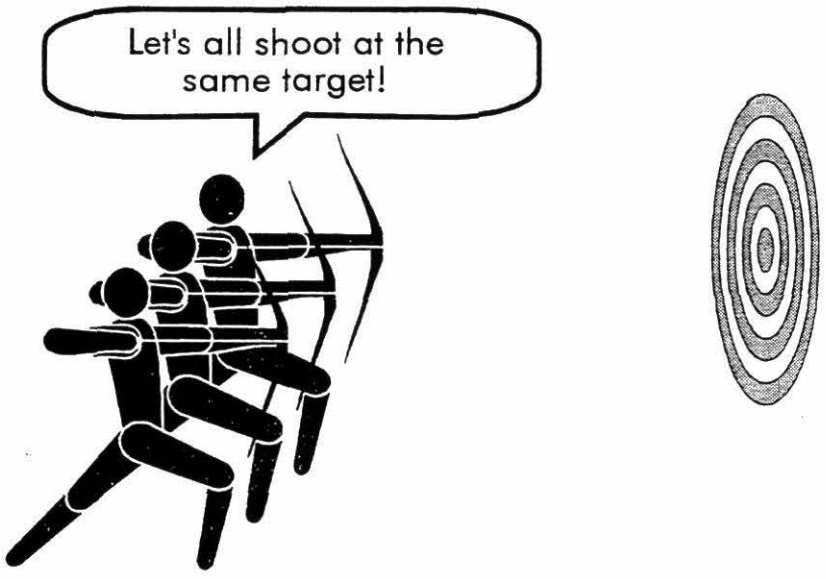


Figure 10. Policies guide actions toward achieving an objective

- As for their scope, policies are classified as general and specific.
- As for the way of making them known, policies are classified as explicit (written and made known widely and publicly) and implicit (not written and for restricted communication)
- As for their origin, policies are classified as established, when they are derived from the mission and objectives; solicited, when they are

derived from claims made by certain groups; and imposed, when they are derived from external pressures.

- As for their objectives, policies are classified as innovative, to combine strengths and opportunities; for maintenance, to use the inner strengths against the external threats; and for survival, to avoid confronting weaknesses with external threats
- As for the levels of decision-making, the classification is made according to where the policies were formulated or managed: strategic; functional; and operational.
- As for their nature, policies can be classified as institutional and technological.

Classification of institutional policies	
a. By their scope General Specific	d. By their objective Innovative For Maintenance For Survival
b. By their way of being made known Explicit Implicit	e. By their level of decision Strategic Funcional Operational
c. By their origin Established Solicited Imposed	f. By their nature Institutional Technological

Well-formulated policies contribute in several ways to the management of an institution. For example, some policies may set limits, boundaries, and restrictions to different actions, while others may open new possibilities for creativity. Some policies clarify what is expected from different groups of staff; improve coordination among different technical and management units; reduce the amount of time that managers need to make decisions; and promote and facilitate the delegation of authority and responsibility. Each unit of an institution should formulate its respective set of policies; all seek the fulfillment of their own objectives.

The basic characteristics of an effective the policy are: (a) flexibility to support the institution's adjustment to the changing environment; (b) "scope" to include relevant aspects that allow the institution to move towards its desired goal; (c) coordination, to concentrate efforts around

related activities; and (d) ethics, so the actors of the institution can carry out their activities according to ethical and moral values.

Examples

Ayres (1993) describes a policy in Agriculture Canada to concentrate funds, allocated by Parliament, on strategic research projects, of great economic and environmental significance, which are unlikely to be carried out by the private sector.

Let's assume that an organization has the objectives described in Figure 9. Some possible policies for this organization could be:

- To define as priority the training of researchers to identify technological, social, and environmental problems related to the agroindustrial complex
- To use our own financial resources for research projects on basic food products and to transfer scientific information
- To seek outside private funding for the research projects on technology for agroindustrial products and processes
- To develop a program to improve quality in the research management, with emphasis on monitoring and evaluation

Methodology

Policies are usually formulated by top management of an organization, but should be made known to and discussed by all staff.

Staff should be aware of the mission and the objectives of the institutes, centers, or programs.

Formulating policies is an activity with much exchange and knowledge, and of group creativity, requiring maximum consensus. The main guides for formulating policies are: the institutional, functional, and operational objectives to be achieved, and external opportunities and threats and internal strengths and weaknesses.

At the different decision-making levels, management should formulate strategic, tactical, and operational policies. The formulation and classification by hierarchy of the policies in each of the levels should follow an approach similar to that for formulating and classifying objectives.

In organizations that produce knowledge, such as agricultural research institutions, institutional, program, and project-level policies should be consistent. For example, if an institutional policy advocates conservation of natural resources, a project to introduce new plant species in a region should explicitly consider this objective.

Validating the Mission, Objectives, and Policies

Collion (1989), affirms that there is often a gap between the expectations of researchers and those of donors and collaborators, as to the mission and objectives of an institute, center, or program. Researchers may be seeking to contribute to international progress in knowledge in their discipline, while donors may expect the organizations to serve the development of agricultural research (Figure 11).

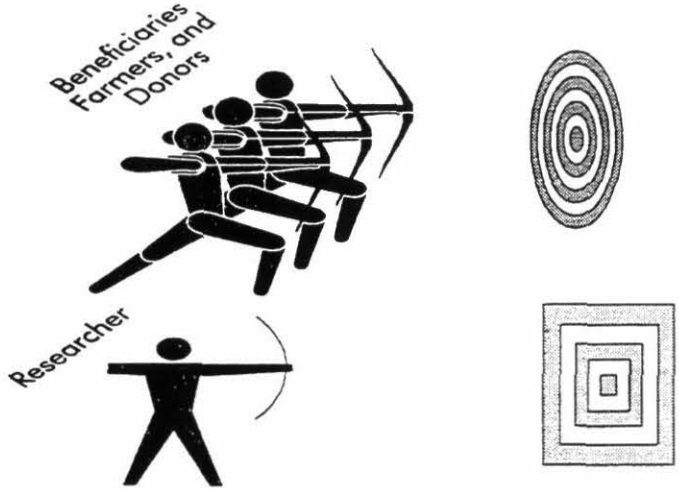


Figure 11. Sometimes researchers and external groups aim at different objectives

According to Paez, *et al,* 1991, there are three steps to validate the mission, the objectives, and the policies:

- Identify a group of organizations representing beneficiaries, users, clients, partners, and donors.
- Ask them to fill out a questionnaire containing the definitions of the mission, objectives, and policies, appraise the relevance of each, and suggest changes. It is important to explain the reasons for the survey in an introduction, and perhaps describe a synthesis of the results obtained in the context and organizational analyses. The author presents an example of a questionnaire with responses that were sent by the institutions in the context of EMBRAPA.
- Review the mission, objectives, and policies, according to the steps previously given.

Formulating Strategies

Concepts

The term "strategy" is widely used in different areas. Many authors define strategy as a logical set of decisions to take an appropriate course of action to achieve an objective. Some define it as a set of organized actions to guide an institution toward the achievement of a certain objective; still others define it as the set of objectives and policies of an institution (David, 1988; Rue & Holland, 1989; Oliveira, 1992; Certo & Peter, 1993). All these definitions are incomplete, however, in the sense that they do not clarify what the basic components of a strategy are.

In order to offer a methodological guide for formulating strategies, we define "strategy" as a logical combination of actors, factors, and actions, selected among other alternative combinations, to achieve a certain objective in a specific context. This definition has three implications:

- To achieve a certain objective there are many possible combinations, and therefore, alternative strategies.
- In order for the same objective to be achieved by different institutions, or similar objetives in different locations, the strategies will be different.
- Considering that there are many possible combinations of actors, factors, and actions to achieve one objective, the selection of a strategy is the result of a political decision.

Strategies can be classified in more or less the same manner as objectives and policies. The possibilities and variations are so many that there is no consensus in the literature with respect to the classification of strategies.

Policies are *general*, they express *desires*, and give focus to *many objectives*.

Strategies are *specific*, they express tasks, and give focus to *few objectives*.

Strategies consists of a *sequence of steps*; policies are *sets of decisions*.

Strategies emphasize the *external environment* (the conditions) in which inputs and processes (actors, factors, and actions) will be combined to achieve an objective.

Policies emphasize the *internal environment* of the organizations.

Methodology

It is most important to understand that strategies are needed because there are opportunities to be taken advantage of, threats to be avoided, strengths to be used, weaknesses to be reduced, and gaps to be overcome.

Most strategists agree that formulating strategies requires much information, intelligence, and creativity (Ohmae, 1983; Mintzberg, 1987). The main consensus among most strategists is that the desired "objective" is the main reference point for formulating strategies. So, the key question is: How can objectives be used in the formulation of a strategy?

Strategies are needed because there are opportunities to be taken advantage of, threats to be avoided, strengths to be used, weaknesses to be reduced, and gaps to be overcome.

The success or failure of a strategy depend on the clarity and precision of the objective. Clarity is needed in: (a) defining the relevant context in which the objective will be achieved; (b) identifying the strategic actors to achieve the objective; (c) identifying the critical factors for achieving the objective; (d) defining the actions with greatest potential for supporting the achievement of the objective; and (e) designing the logical steps of the strategy that will combine the actors, factors, and actions to achieve the objective in its corresponding context.

The desired "objective" serves as a source of inspiration for carrying out the task. The success or failure of a strategy can depend upon the clarity and precision of the objective. Besides this, the lack of commitment of those who make decisions has been a cause of failure for many strategies

Ten key elements for defining an objective are presented in Table 15.

Table 15. Questions that must be answered when defining a strategy's objective

Questions	Justification
1. What are the most critical external factors, positive or negative, for defining the objective?	Most objectives are affected by factors beyond your control. It is necessary to consolidate your own interests with external expectations.
2 What price are you willing to pay to achieve objective?	Achieving any objective has a **price.**
3 What are the critical limits of those interested in achieving the objective?	Certain **limits** cannot be passed.
4 What small concessions can you offer from the beginning as a proof of good will to get the necessary support?	You can make some small **concessions without compromising** the general objective.
5 Which concessions are you willing to make in the most critical moment of negotiation to obtain your objective?	Often you must make major concessions to obtain an objective.
6 What are the time restrictions for achieving the objective?	Every objective requires **time** to be achieved.
7 What are the most critical external factors, positive or negative, for achieving the objective?	**External factors** beyond the control of those interested affect most objectives.
8 What critical questions can the opposition present, and what would be the logic for answering them?	Every objective generates **questions**, usually from the opposition.
9 Who are the most important actors in relation to the proposed objective?	There are several **actors** related to the process of obtaining an objective.
10 What is the best way to begin the strategy, causing the best initial impact?	There are **many ways** of beginning a strategy.
11 What actions could other actors initiate, and how can we neutralize those actions?	Like a chess game, other **actors** interested in obtaining the objective may begin actions that affect the strategy's development.

Adapted from Fuller, G. 1993. Estratégias do negociador. Sao Paulo: Livros Técnicos e Científicos.

Six steps are useful for the formulation of a strategy (Figure 12):

1. What is the **objective** to be achieved? Define it clearly and precisely, (Table 15). The objective is the "Product" aimed for with the strategy.
2. What is the **context** in which the objective must be achieved? The "Context" offers key information on the relevant actors, factors, and actions in the formulation of a strategy.
3. Who are the relevant **actors** to achieve the objective? Look at the different groups of internal and external actors who can affect, positively or negatively, the selected course of action for achieving the objective. The identified actors are important "Inputs" for formulating the strategy.
4. What are the strategic **factors** for achieving the objective? Evaluate the external and internal factors that may be useful for achieving the objective. These key factors are relevant "Inputs."
5. What are the most important **actions** that should be organized to achieve the objective? Think of actions in the short-, medium-, and long-term that could contribute to achieving the objective. These actions are the "Processes" that the strategy uses to combine actors and factors in logical steps toward an objective.
6. What are the **logical steps** of the strategy, and in what order, to assure the best combination of actors, factors, and actions to achieve the objective? The steps correspond to possible series of actions needed to produce a specific impact. Each step is the basis for the success of the following step, so designing the logical order of the steps is fundamental in the formulation of the strategy.

Before beginning to formulate a strategy, it is important to assure that those who decide on its formulation and implementation are sufficiently motivated and will act strategically with the purpose of reaching the proposed objective. After lack of clarity and precision in the definition of objectives, the lack of commitment and participation by the decision-makers has been the main reason for the failure of many strategies.

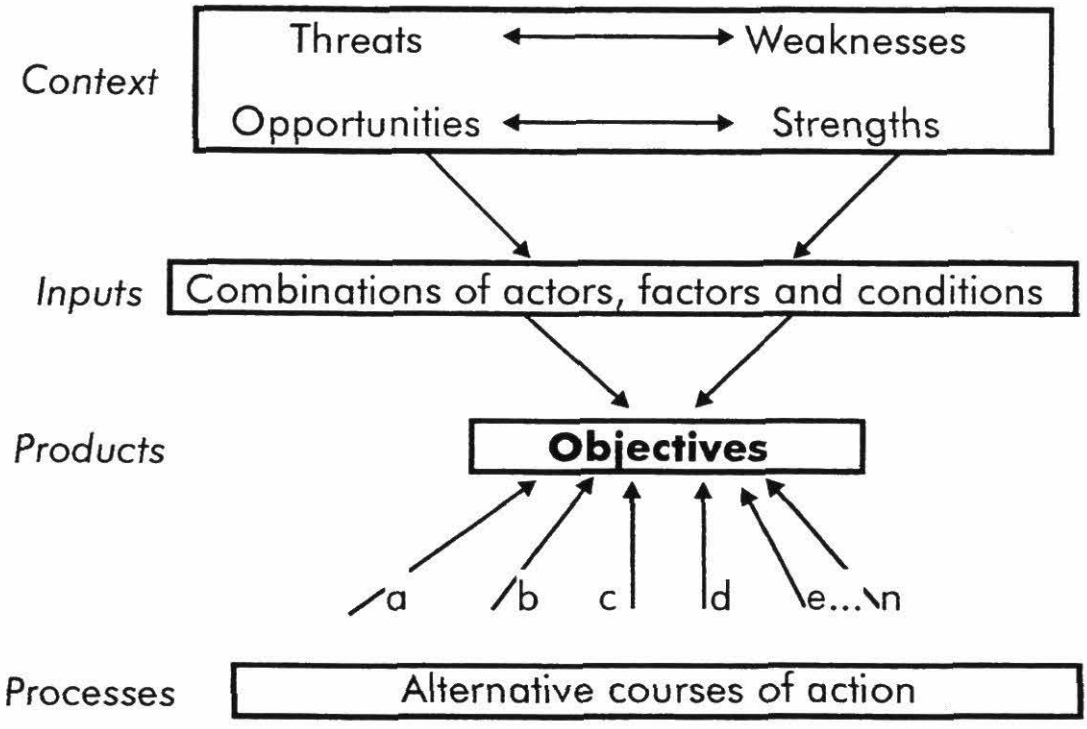


Figure 12. Formulating strategies with the CIPP approach

Exercise 3.1 Formulating Mission, Objectives, Policies and Strategies

Guidelines for the Instructor

Objectives

- ✔ Formulate the mission (of the institution or program).
- ✔ Identify objectives.
- ✔ Formulate policies.
- ✔ Establish strategies.

Required materials

- Sequence 3 from this module
- Results (tables, worksheets, summaries) of previous exercises

Methodology

To carry out this exercise, the participants should take into account the material produced in the exercises of the previous sequences:

- Interests and needs of groups and institutions
- Context, organizational, and gap analyses, together with the strengths and weaknesses at the level of inputs, processes, and products

Next, each of the two working groups formed in Exercise 2.1 will continue carrying out the steps to fulfill the responsibilities outlined in Exercise 2.1:

1. Present a basic outline for institutional planning that will contribute to achieving the required objectives of credibility and funding to be able to carry out its mission and institutional objectives.
2. Describe the general outlines of the national biotechnology program, clearly identifying the needed resources, the products to be generated, and their use. Besides, the Director General of the NARI hopes that specific recommendations will be made about the way in which the new program should be incorporated into the existing structure of the institution.

Instructions

1. Work with the same four work groups, 1, 2, 3, and 4.
   - Groups 1 and 2 formulate the strategic plan at the institutional level.
   - Groups 3 and 4 formulate the strategic plan for the national biotechnology program.
2. Each group receives the guide for group work.
3. In a plenary session, explain the guide for group work.
4. Each group will present and argue the basic outlines of the strategic plan they have developed. The presentation should not exceed 10 minutes. At the end there will be a plenary discussion of 20 minutes.

Suggested time for this exercise

•	Work groups	60 minutes
•	Presentation in plenary session	40 minutes
•	Discussion and feedback	20 minutes
	Total	120 minutes

Exercise 3.1 Formulating Mission, Objectives, Policies and Strategies

Participants' Guidelines

1. Each group names a coordinator and a rapporteur.

2. Each coordinator describes the work assigned to the group:
   - Formulate the basic outlines of the strategic plan for the national research institution; or
   - formulate the general outlines of the strategic plan for the national biotechnology program

3. Each group will present the outlines of its plan in the plenary session. Time for each presentation: 10 minutes.

Exercise 3.1 Formulating Mission, Objectives, Policies and Strategies

Feedback

The following are examples of elements of a strategic plan, taken from recent publications of the Colombian Agricultural Research Corporation (CORPOICA)

What is its mission?

To contribute to improve the welfare and the quality of life for the Colombian people, through the development of knowledge and techniques that integrate the objectives of competition, equity, sustainability, and scientific capacity, as a strategy to improve the relevance and ability for research to respond to the development needs of the national agricultural sector.

How does it function?

Fundamental aspects of the Corporation's function are the regionalization and decentralization of resources, decision-making, and participatory planning, through which it is sought to assure agreement on the research priorities by all the different users: producers, government, professional unions, and the academic community. The Corporation will operate in its own projects, collaborative projects, businesses with shared risk, service contracts, and others.

What is its research system?

The research system is made up of three program levels, according to the type of research and the geographical scope of its operation. The national programs carry out specialized, widely applicable strategic research. The regional programs study the problem of production systems predominant in their areas of influence, and the potential of promising systems to generate appropriate alternative technologies. The local programs validate and adjust available technologies to the specific conditions of different micro-regions. This system demands a close interaction of the three levels to function successfully.

What topics does it cover?

The research and transfer system described above considers in its different programs the following topics and approaches to research:

Sustainability. Development of efficient and productive agricultural systems that assure the conservation of natural resources in the long run.

Biodiversity. Characterization, evaluation, and conservation of the potential of ecological, biological, and genetic diversity in the country, in order to offer new possibilities for production and to improve the opportunities of scientific and technological development.

Biotechnology. Adaptation and development of modern techniques in molecular biology, cellular biology, and genetic engineering, to raise the efficiency in the research processes and to develop adequate solutions for the agricultural problems of the country.

Agroecosystems. Determination of the capacity of different agroecosystems and monitoring of environmental indicators associated with agriculture, in order to improve the capacity of sustainable production and to support the decision-making process in the public sector. Modern tools will be used, such as geografical information systems, and system modelling .

Inputs. Development of technological systems that encourage the efficient use of agricultural inputs, in order to reduce costs of production and diminish environmental risks and potential damages to the consumer, through integrated pest management, nutrient recycling, the use of subproducts, etc.

Postharvest. Development of methods and techniques for postharvest processes that contribute in maintaining the quality of the agricultural products, that facilitate their handling, reduce losses, and promote the use and recycling of subproducts according to the needs of the different markets.

Information systems. Development of information systems and computer programs specially designed to support the research activities and agricultural technology transfer.

Technology transfer. Development of a transfer strategy that gives researchers access to the sources of scientific knowledge and technology, and gives the producers access to the technology available in the corporation. They use strategies that include efficient and appropriate communication media, according to the needs of the different types of users and agroecological zones, to contribute to the policies adopted by the National Technology Transfer System (SINTAP.)

Plant and animal health. Development, adaptation, and standardization of advanced methods and techniques of diagnosis and epidemiology, in order to support the actions of ICA (Colombian Institute of Agriculture and Livestock) in the control and prevention of disease.

CORPOICA's Objectives

The general objective of CORPOICA is to contribute to increase the welfare of the Colombians through generation, transfer, and adoption of technology that makes agricultural production more efficient. The corporation's activities are directed to four specific objectives:

- Increase the competitiveness of the agricultural sector.
- Integrate the small producer to this process, seeking an equitable development.
- Assure the development of sustainable agriculture, based on rational use of natural resources and the environment.
- Develop a national scientific and technological capacity to generate the technology that the country needs, have access to site's specific technology and count on a sufficient capacity to handle it.

CORPOICA's Strategic Framework

The structure and the programs of CORPOICA are derived from a "Strategy for Research and Technology Transfer," whose main characteristics are:

- Concentration on research areas of strategic importance to ensure development or adaptation of needed technology, to achieve a greater international competitiveness.
- Emphasis on the characterization of agroecosystems and production systems, so that research can respond to specific production problems (focus on demand).
- Decentralization and "regionalization" of the research programs, so that they can meet the needs of each region of the country.
- National programs are multidisciplinary. Specific disciplines and commodities become parts of the regional or national programs.
- Integration of research and transfer activities. This should take place at all levels of research, either directly or in cooperation with other technology-transfer agents.
- Importance of direct interaction with producers in diverse phases of research, considering it necessary to validate and adapt technology at the level of the municipality.
- Need to develop specialized research to support the national agricultural health system.
- Need to develop a strategy of intellectual property rights that will facilitate access to international technology and protect the national investment in research in this field.
- Emphasis onresults and impact in terms of the four objectives of CORPOICA
- Importance of monitoring socio-economic and enviromental impacts.
- Participatory planning and programming, seeking a "social control" for research by the partners of the Corporation and the users of the technology (role of the regional and local boards and of the national council of the Corporation).

- Agreement with the private sector and non-governmental organizations in the development of collaborative research and technology transfer programs in areas of common interest.
- Integration in a national agricultural research system, in which universities, and other research centers play an important role. CORPOICA and ICA are central actors in this system.

This set of strategic considerations implies a new approach and framework of action for agricultural research in the country.

This Sequence presented an approach for the formulation of the mission, objectives, policies, and strategies of an institution or program.

Summary

After conceptualizing the mission as the major purpose, or the most comprehensive reason for the existence of an institution, the Sequence presented a methodology for its formulation, translated into a matrix containing the information from a hypothetical case. Most important in formulating the mission was the presentation of a "mission statement".

An objective was defined as a future state, situation, or result that somebody wishes to achieve. Three categories of objectives were presented: institutional, functional, and operational. There are no established rules for formulating objectives, but the Sequence introduced some practical guidelines and steps, than can be used to formulate objectives for an institution, center, program, or project.

Policy was introduced as a term for drawing up guidelines, practices, procedures, rules or parameters that stimulate, support, or orient decision-making. Policies were classified according to the form they are communicated their origin, objectives, levels of decision-making, and nature. Finally, recommendations were offered for formulating policies.

The sequence ends with the concept of strategy and a framework for its formulation. Strategy was defined as a combination of actors, factors, and actions, selected from among other alternative combinations, to achieve a certain objective within a specific context.

There is no fixed method for formulating strategies. The Sequence argues that the desired objective is the key reference point that a manager should have for this task. The Sequence presents a set of questions about an objective, to define it with maximum clarity and precision, and a framework for formulating strategies using the CIPP model.

The Sequence closes by drawing attention to the fact that the lack of commitment and participation of decision-makers in the process of formulating and implementing a strategy has been a main cause of the failure of many institutional strategies.

Final Exercise. Panel on Institutionalization of Planning

Introduction

It is impossible to overemphasize the importance of institutionalizing planning activities. The best way of discovering this importance is not by theorizing but by assessing real-life experiences. This exercise is organized as a Panel on *Institutionalization*, involving key professionals (selected from among the participants or instructors) with experience in implementing an institutional planning process, in creating a planning unit, or in taking part in a planning team.

Following a five-step approach, this exercise invites a team of panelists to prepare and organize presentations on the process of institutionalizing planning.

All the participants in the course will have the opportunity to debate with the panelists the possible factors for success and failure in such institutionalization process.

A guest instructor presents the conclusions and recommendations resulting from the debate. These results constitute an important input for the formulation of the plan of action that is drawn up during the course.

Objective

To explain the factors for success and failure in the institutionalization of planning, and to develop strategies to lead institutionalization of planning, with the strategic approach, in an agricultural research institution or program.

Methodology

Step 1: Three panelists will be selected from among the participants and / or instructors, and invited to present their concrete experiences, emphasizing their opinions on the importance and the manner of conducting a process of institutionalization of planning.

Step 2: Next, the panelists, based on their own experiences, will present their opinions on relevant aspects of the institutionalization of planning, such as:

- Components, processes, and critical factors for the institutionalization of planning.
- The planning unit: its functional placement, the composition, training, and functions of the planning team.

- Factors for success: How to achieve them? Prejudices: How to combat them?
- The materials and techniques needed
- What should be decentralized?
- How to achieve motivation and commitment in planning?
- What are the training needs in planning at the different levels?
- How to guarantee that planning is integrated with monitoring and assessment?
- Who should be the most involved and committed actors, and at what levels of the process of institutionalization of planning?

Step 3: After the presentations of the panelists, the other participants will have the opportunity to debate with them and share their own experiences and opinions.

Step 4: At the end of the debate, a guest instructor should present a comprehensive synthesis of the main points of agreement and the differences in the experiences and opinions of the panelists and participants.

Step 5: After the synthesis, the guest instructor will present the most general conclusions about achieving the institutionalization of planning. The synthesis and conclusions will be copied and given to all the participants.

Guidelines for the Instructor

- Select three or four participants who have experience in implementing an institutional planning process, to act as panelists.
- Instruct these panelists to give their opinion about the aspects as suggested in Step 2 above. They should prepare a transparency to illustrate their presentation.
- Select among the other instructors a commentator (the guest instructor) to give the general synthesis of the presentations and of the discussion. Ask the commentator to make a final list of conclusions.
- Structure the panel according to the following schedule:

Panelist presentations	60 minutes
General discussion	40 minutes
Commentator	20 minutes
Total	120 minutes

Final Exercise. Panel on Institutionalization of Planning

Guide for the Panelists, Participants, and Commentator

Panelists

- With the help of transparency, relate your personal experience in the institutionalization of planning, in 15 - 20 minutes
- Emphasize the aspects laid out in the section on methodology of this exercise, Step 2
- Separate the positive and negative points that can be identified in your particular case
- Reflect on points to be improved to facilitate the institutionalization of planning

Participants

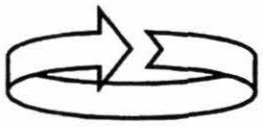
- Try to outline common and different points in the panelists' presentations
- Compare these points with your personal experience and that of your institution
- Share your opinions
- Make at least one suggestion to facilitate the institutionalization of planning in a national agricultural research institution

The commentator

- Identify three positive and three negative common points of the experiences related by the panelists and participants
- Suggest how to make the most of this experience within the national research institutions of the region. How can the positive experiences be applied? How can the negative experiences be avoided or minimized?

Final Exercise. Panel on Institutionalization of Planning

Feedback



The experiences presented by the panelists may resemble the following example, although their contributions may be more extensive and complete.

CORPOICA

An external group of consultants was asked to identify: objectives, strategies, and programs. The group interacted with the scientists of the institution. The group was institutionalized as a planning office attached to the Office of Executive Director.

Their success is due to the support given by top management, despite some resistance by the scientists.

Once the strategies and programs were established, the planning for each program was decentralized. Each program must establish its own medium and long-term plans.

Materials are needed to make middle and operational management aware of the objectives and strategies of the institution.

Documents, manuals, and procedures are needed to bring a degree of homogeneity to the decentralized task of planning programs, especially for: resource inventory, identification of needs, plans of action.

Top management must give feedback in terms of budget allocation and research resources.

An operational institutional plan of at least two years should be formed to permit monitoring and assessing of each program.

Appendices

Appendix 1 Information about Participants

Instructions

Please fill out this questionnaire at the beginning of the course to share with your colleagues some personal and professional information as well as the expectations you have for the course. Prepare your answers according to the guidelines that your instructor gives you.

Items

1. What is your name? _____
2. What is the highest academic degree you have? _____
3. Do you have a specialty? In what area? _____
4. What experience do you have as an agricultural research manager? _____
5. What is your current position? _____
6. In which institution do you work? _____
7. How many years have you worked there? _____
8. Can you tell us something about your personal and family life? _____

   _____
9. What do you hope to achieve in this course? _____

   _____

Appendix 2 Posttest

Guidelines for the Instructor

After finishing this module, give the posttest. Its purpose is to inform the participants to what extent they have achieved their objectives.

After the participants have finished the test, give them some feedback, offering alternative answers to the question. Each participant can compare these with his or her answers. Then lead a discussion on the participants' answers.

Finally, participants will compare the results of their pretest with the results of thier posttest; in this way they can assess what they have learned in this module.

Remember that this a informative test, whose purpose is not to grade the participants, but to give them the opportunity to affirm the knowledge gained and clarify any doubts they might have.

Posttest

Participants' Guidelines

Play the role of an advisor who has been asked to help an institutional work group formulate a strategic plan for a program.

The work group has asked you to give them guidelines for writing the plan. These guidelines should contain all the elements that you consider indispensable for formulating an adequate strategic plan for a program. The members of the team also happen to be the leaders of the different programs in the institution.

In preparing the guidelines, you should:

- show that you adequately use the concepts covered in the module;
- master the methodology for formulating strategic plans;
- pay attention to the institutionalization process of planning.

Posttest

Guidelines for Preparing a Strategic Plan for a Research Program

Appendix 3 Feedback for the Posttest

Guidelines for the Instructor

Guidelines for formulating a strategic plan for a program should include:

- **Identification of the level for which you are planning**
- **Approach:** strategic, tactical, operational
- **Methodological considerations:**
  - Organizational and gap analyses
  - Formulation and validation of the mission, objectives, and policies
  - Selection and formulation of strategies
  - Institutionalization
  - Relationship with monitoring and assessment
- **Context analysis**: internal and external
  - Political, economical, technological analysis and its effects on the program;
  - Consultations with experts about the context
- **Organization and gap analysis**
  - Gathering and analyzing data
- **Outline of actions** for implementing the planning exercise

The proposal for formulating a strategic plan should include:

- **Concepts** such as: levels and approaches of planning (institutional, center or research program; with strategic, tactical, or operational approach)
- **Methodological considerations** for strategic planning: organizational and gap analyses; formulation and validation of mission, objectives, and policies; formulation and selection of strategies; aspects related to the institutionalization of the plan and interaction mechanisms of PM&E
- **Context analysis.** This should indicate the need to design visions of the future economic, political, and technological context, and of the possible repercussions that these can have on the institution or program. Also indicate the need for consultation with internal and external experts related to the present situation and the future tendencies
- **Organization and gap analyses.** It should indicate the need to identify data to be gathered, the procedures for gathering and integrating data, and defining the products expected from the process (strengths, weaknesses, and gaps)

- **Formulation and validation of the mission, objectives, and policies.** This should include the use of a participatory methodology, involving internal and external, and suited to the previously groups identified threats, opportunities, strengths, weaknesses, and gaps.
  Participatory methodology includes: the gathering of data and the subsequent consultation on decisions, with the sectors involved.
  External groups can be: the Ministry of Agriculture, extension services, agroindustry, producers associations, universities, science and technology councils, political organizations, and professional organizations
  Internal groups can be: directors, researchers, management, field and lab technicians, those who transfer knowledge
- **Formulation and selection of strategies.** This should include the steps for formulating and selecting strategies
- **A description of activities for implementing** the strategic planning. This should include activities that:
  - Promote the image
  - Make the internal and external sectors aware of the goals of the institution
  - Stimulate the negotiation to seek resources and political support
  - Organize training for Strategic Planning
  - Decentralize of proposed consultations and decisions

Also, there should be mechanisms that guarantee:

- Continuous flow of information among these processes
- Congruency among them
- No repetition of actions
- These links become concrete in the research project

Appendix 4 Evaluation of the Instructor´s Performance

To be answered by each participant

Date: _____

Name of the instructor: _____

Topic(s) covered: _____

Instructions

This questionnaire aims to evaluate the performance of the trainer. Please put an "X" in front of each one of the phrases you feel describes the instructor's performance.

Put an "X" in the "YES" column when you are sure the instructor's performance fits the description given; in other words, the instructor did what is specified in the phrase.

Put an "X" in the "NO" column if you did not observe this behavior. Leave the space blank if you are unable to observe said behavior.

Do not sign the questionnaire. In this way, we hope you will feel free to express your opinion.

1. Organization and clarity

The instructor...

		YES	NO
1.1	Presented the objectives of the activity	❑	❑
1.2	Explained the methodology to follow in the activity	❑	❑
1.3	Respected stipulated time limits	❑	❑
1.4	Provided written material on the presentation	❑	❑
1.5	Followed a clear order during the presentation	❑	❑
1.6	Summarized fundamental aspects of the topic covered	❑	❑
1.7	Spoke clearly, using an appropriate tone	❑	❑
1.8	Used teaching aids that made topic easier to understand	❑	❑
1.9	Presented enough information to facilitate learning	❑	❑

2. Knowledge of subject matter
The instructor...

2.10	Seemed sure of the information presented	❑	❑
2.11	Adequately answered the questions the audience asked	❑	❑
2.12	Gave updated bibliographic references	❑	❑
2.13	Related the theoretical aspects of the topic with practical applications	❑	❑
2.14	Gave examples that illustrated the topics presented	❑	❑
2.15	Centered the audience's attention on the most important aspects of the topic	❑	❑

3. Interaction skills
The instructor...

3.16	Established a rapport with the participants	❑	❑
3.17	Used a language level that was appropriate for the audience's level of knowledge	❑	❑
3.18	Inspired confidence so participants would ask questions	❑	❑
3.19	Was interested in the group's learning	❑	❑
3.20	Established eye contact with the audience	❑	❑
3.21	Asked questions to the participants	❑	❑
3.22	Invited the participants to ask questions	❑	❑
3.23	Provided immediate feedback to participants' questions	❑	❑
3.24	Showed interest in the topic covered	❑	❑
3.25	Kept the audience's interventions from diverging from the topic	❑	❑

4. Guidance of exercises (workshop, classroom)
The person in charge of conducting the exercises...

4.26	Explained the objectives of the exercise	❑	❑
4.27	Selected/organized an adequate location for the exercise	❑	❑
4.28	Organized the audience so all could participate	❑	❑
4.29	Explained and/or indicated how to carry out the exercise	❑	❑
4.30	Had all the demonstrative materials and/or necessary equipment on hand	❑	❑
4.31	Provided the participants with the necessary materials and/or equipment to carry out the exercises	❑	❑
4.32	Handed out exercise instructions	❑	❑
4.33	Carefully supervised the exercise	❑	❑
4.34	Gave the participants the opportunity to practice what they were supposed to learn	❑	❑

Appendix 5 Guide for Presenting Reports on Instructor's Performance

Instructions

The questionnaire for evaluating instructor's performance has a total of 34 items pertaining to four aspects on which good training is based. Instructors interested in improving their performance should ask trainees to fill out a form like this one.

Following is a sample page that the instructor or course coordinator can use to record the data obtained in the instructor evaluation form.

Ten participants is a good sample for an evaluation. A large group, for example of 30 participants, can be divided in three subgroups to evaluate three instructors. In this case, we will assume that the form has been distributed to 10 participants in a course to evaluate one of the instructors. If the instructor did all the items listed in the form, according to the participants, the total points for each category would be:

1.	Organization and clarity	90 points (9 items x 10 participants)
2.	Knowledge of theme	60 points (6 items x 10 participants)
3.	Interaction skills	100 points (10 items x 10 participants)
4.	Direction of practice	90 points (9 items x 10 participants)

But very few instructors will earn a perfect score; most likely they will have some weaknesses in some of the categories.

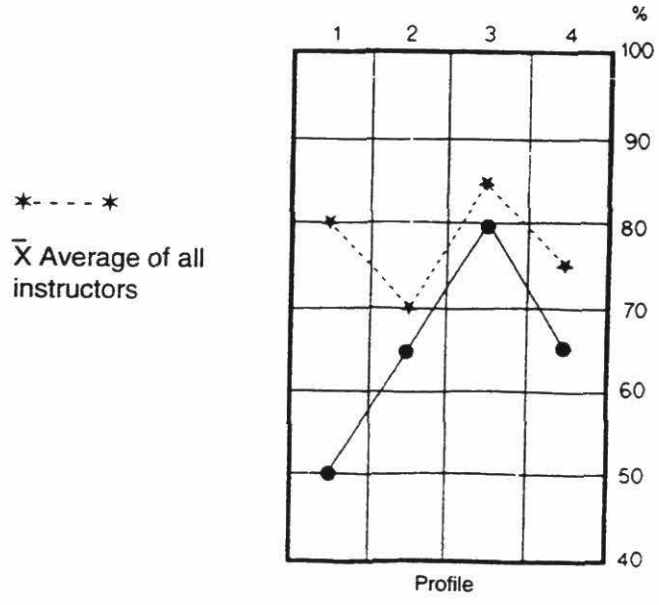
To calculate a score, follow this procedure:

1. Each positive answer is assigned one point. NO answers and blank answers are not counted. **Only YES answers are counted.**
2. Item by item, process all the information from the questionnaires.
3. Next, add and total the points for each box. Put the sum of the boxes of the same category (i.e. organization and clarity) in the central column of the grid labeled *No. of points* (See page A-12). In the column headed by "100%," write down the score that would be obtained if all participants had answered YES for all items. The relation between 100% and the score by the instructor establishes the instructor's percentage. For example, if 100% of the answers of 10 participants in the "organization and clarity" category is 90 and the observed score for an instructor is 45, in the column %, we would write that the observed score is 50%.

4. The central column can show data like the following:

100%	No. puntos	%
90	45	50
60	40	67
100	80	80
90	60	67

5. In the grid below, we can graph the information we have obtained for a particular instructor. We can also indicate, with a dotted (or red) line, the average scores of other instructors in the same training event.



This profile would indicate that the instructor has a better performance in "ability to interact" and that his major weakness is in "organization and clarity." It would also indicate that in the four areas evaluated, his/her percentage is lower than the average for the remaining instructors in the same event.

6. The course coordinator can write comments and send the report confidentially to each instructor, to inform him/her of his/her strengths, and the areas in which he needs to make an extra effort to improve his performance as an instructor.

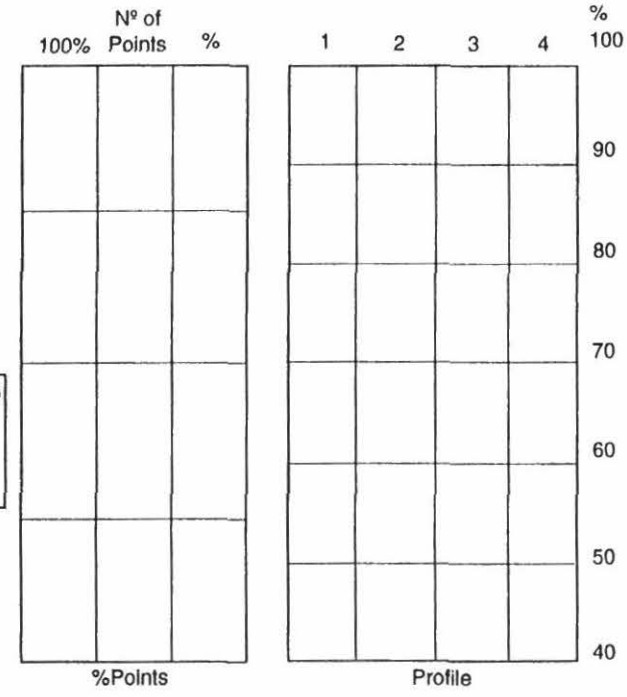
Evaluating Instructors*

Report

Instructor's name: _____ Subject(s) covered: _____

Date: _____

Organization and Clarity	1	2	3	4	5	6	7	8	9
Knowledge of Subject Matter	10	11	12	13	14	15			
Interaction Skills	16	17	18	19	20	21	22	23	24	25
Guidance of Exercises	26	27	28	29	30	31	32	33	34	



Comments from course coordinator: _____

*Dotted line in profile indicates the average for all instructors

_____
Signature of course coordinator

Appendix 6 Evaluation of the Module

Participant Worksheet

Instructions

Your opinions regarding the activities, materials, and content of this module will help us improve it.

Please evaluate each component of the module which appears on the left column, by marking an "X" in the space which expresses your opinion. 0 = very bad; 1 = poor; 2 = good, 3 = excellent.

We appreciate your cooperation.

Evaluation Criteria														
Module 2	2. Quality in relation to the audience's level				2. Usefulness in training others				3. Quantity of information provided and according to the participants needs			4. Time given to each item		
Activity, material and/or content	0	1	2	3	0	1	2	3	Little	Adequate	Too much	Little	Adequate	Too much
• Introduction to module														
• Sequence 1														
- Planning in Latin America and the Caribbean														
- Conceptual framework for planning														
- Guidelines for the exercises in module 2														
- Exercise 1.1 Critical planning factors														
• Sequence 2														
- External analysis														
- Organizational analysis														
- Gap analysis														
- Exercise 2.1 External, internal, and gap analyses														
• Sequence 3														
- *Formulating the mission*														
- Formulating the objectives														
- Formulating the policies														
- Validating the mission, objectives, and policies														
- Formulating the strategies														
- Exercise 3.1 Formulating mission, objectives, policies, and strategies														
• Final exercise: Panel on institutionalization of planning														
• Reading materials (lectures)														
• Guidelines for exercises														
• Transparencies														

Appendix 7 Evaluation of the Training Event

Instructor Guidelines

Use the following questionnaire at the end of a course, seminar or workshop. The questionnaire is quite general and may be adapted to fit the specific situation of each course. For example, you will probably want to develop some specific questions regarding the objectives and content.

When you are giving a complete course, hand out the questionnaire on the day prior to the course's completion. This way you can process the answers and present the results to the participants at the end of the course. This feedback will be useful for the participants.

Some of the questions at the end of the questionnaire refer to plans which you may wish to implement after the training event. The answers are useful to monitor the proposed activities. If the participants prepare an action plan and implement it these questions can be eliminated from the questionnaire.

Before giving the questionnaire to the participants make sure you emphasize the importance of them answering the questions in helping improve the course. Urge the audience to critically analyze all aspects of the course.

Evaluation of the Training Event

Participant Worksheet

Name of the event: _____

Location of the event: _____ Date: _____

Instructions

Your opinions on different aspects of this course will help us improve the course.

You do not need to sign this form. Please remember that improvements in this activity depend largely on the sincerity of your answers.

The evaluation form should be filled out as follows:

a. Assign a value to each question on a scale of 0, 1, 2, 3, where:
   - 0 = Poor, inadequate
   - 1 = Average, mediocre
   - 2 = Good, acceptable
   - 3 = Very good, highly satisfactory

b. Write your comments about each item in the space provided below each question, according to the score you assigned to it. Please refer to both POSITIVE and NEGATIVE aspects. Leave the space blank when the item did not take place or when you think you did not have a good chance to observe.

Questions about the event

1. Learning objectives

1.1 Did the proposed objectives of the course correspond to your learning expectations? 0 1 2 3

Comments: _____

_____

_____

1.2 Did the course achieve its proposed objectives? 0 1 2 3

Comments: _____

_____

_____

2. Do you think the course filled the gaps in knowledge you had at the beginning of the course? 0 1 2 3
Comments: _____

_____

_____

3. Methodological strategies used

3.1	Lectures/presentations of the instructor(s)	0	1	2	3
3.2	Group work	0	1	2	3
3.3	Amount and quality of teaching materials	0	1	2	3
3.4	Evaluation system	0	1	2	3
3.5	Classroom exercises	0	1	2	3
3.6	Teaching aids (flip chart, projector, videos, etc.)	0	1	2	3

Comments: _____

_____

_____

4. How useful was the content of this course to your current or future work? 0 1 2 3
Comments: _____

_____

_____

5. Coordination of the event

5.1	Information to participants before the course	0	1	2	3
5.2	Sticking to schedule and/or program	0	1	2	3
5.3	Group guidance provided by local coordinator	0	1	2	3
5.4	Logistic support (equipment, materials, stationery)	0	1	2	3
5.5	Supervision of group	0	1	2	3
5.6	Supervision of activities	0	1	2	3

Comments: _____

_____

_____

6. Time dedicated to the event in relation to the objectives and the amount of content to be covered 0 1 2 3
Comments: _____

_____

_____

7. Other general activities or events that positively or negatively influenced your satisfaction with the course

7.1	Lodging	0	1	2	3
7.2	Food	0	1	2	3
7.3	Location of the course and its logistic conditions	0	1	2	3
7.4	Transportation	0	1	2	3

Comments: _____

_____

_____

8. Do you have any specific suggestions to improve the event?

8.1 Course-specific (conferences, teaching materials, exercises)

a. _____

b. _____

c. _____

8.2 General (transportation, food, etc.)

a. _____

b. _____

c. _____

Future activities

9. While attending the course did you plan on how to apply or transfer what you were learning after you return to work? In what way?

_____

_____

_____

10. What resources or support will you need in order to carry out what you have learned during the course? _____

_____

_____

_____

Appendix 8 Terms Used in the PM&E Modules

The training materials on PM&E use a number of general concepts related to agricultural research management. Not strictly limited to definitions of terms, they propose concepts that reflect the thinking of the authors in relation to the general theme.

Accountability
The obligation to report, explain, or justify something. The responsibility of an organization or its staff to provide evidence of research expenditures and performance to donors or higher levels of management.

Assumption
A fact or statement that is accepted as true. In relation to the logical framework, it is a statement about factors that can influence the achievement of objectives but which are beyond the control of researchers, such as political or economic policies or the availability of farming inputs.

Beneficiaries
People, households, organizations, communities, or other units that are affected positively by (or *benefit* from) a research program or activity.

CIPP evaluation model
A conceptual framework for improvement-oriented evaluation. CIPP stands for four kinds of evaluation:

- *Context evaluation.* Assessing the context of a program, identifying target populations and their needs, identifying opportunities and problems in addressing needs, and judging the responsiveness of goals and objectives to assessed needs.
- *Input evaluation.* Identifying and assessing alternative strategies, schedules, budgets, resource requirements, and procedural designs needed to accomplish the goals and objectives of a research activity.
- *Process evaluation.* Assessing the implementation of a plan by recording and judging ongoing activities and accomplishments in relation to the procedural design. It provides information helpful for changing operational plans during implementation.
- *Product evaluation.* Measuring, interpreting, and judging the attainments of a research activity. Intended to interpret the work and merit of an activity's final outcomes in relation to the needs of the group it is intended to serve.

Clients
The intended users of agricultural research products, generally including farmers, agribusiness entrepreneurs, policymakers, extensionists, and consumers.

Criteria
A standard of judgement. The basis for a comparison, a test or an evaluation.

Decision-making level
The level within a research organization or system (for example, the level of the researcher, project manager, experiment station or institute manager, or policymaker) at which a particular decision is made, or to which an evaluator reports.

Effectiveness
The degree to which an activity, project, or program attains its objectives. The extent to which outputs are obtained and effects achieved in relation to objectives.

Efficiency
The degree to which an activity produces outputs at the least cost.

Evaluation
Judging, appraising, or determining the worth, value, or quality of research — whether it is proposed, ongoing, or completed — in terms of its relevance, effectiveness, efficiency, and impact.

Ex ante evaluation
An assessment done before research begins, usually in terms of its relevance, feasibility, potential impact, or expected benefits. Can be used to define a baseline against which progress towards objectives can be measured or to set priorities among several research areas.

Expert review
(See *peer review.*)

Ex post evaluation
An assessment of an activity or its outputs after the activity has been completed. The purpose is usually to estimate benefits in relation to costs.

External analysis
Sometimes called prospective analysis of the external environment (or context analysis). The process of assessing and evaluating the external environment, to identify present and potential opportunities and threats, which can influence the institution's ability to achieve its objectives. (See also *organizational analysis.*)

External environment
In the case of agricultural research the macro-environment that affects an institution, program, or project. At this level, events are practically beyond the organization's control. Examples are governmental policies, consumption trends and development of new scientific knowledge.

External review
Evaluation of a research system, organization, program, or project carried out by persons from outside the unit being evaluated. Usually conducted by experts or peers, but research clients, supporters, or stakeholders may also participate in the evaluation.

External validation
The process by which internal decisions are discussed within external stakeholders, in order to confirm or revise them. In strategic planning, conclusions about threats and opportunities, and the mission, objectives, and policies are generally validated externally.

Formative evaluation
An evaluation aimed at providing information to planners and implementors on how to improve an ongoing program or project.

Gap analysis
An assessment of the requirements of a research plan in terms of the resources needed (financial, human, and physical) to achieve the desired goals.

Goal
Used in the logical framework, a goal is the ultimate end or objective towards which a research activity, project, or program is directed. It is usually something like improving incomes for farmers. (See also *objective*, *purpose* and *output.*)

Impact
The broad, long-term effects resulting from research, usually economic, social, and environmental.

Input
In terms of the logical framework, inputs refer to the resources needed to implement a project, including personnel, operating funds, facilities, and management.

Institutional sustainability
An organization's condition of being accepted and considered legitimate by society. Institutional sustainability has several requirements including (a) an institutional project (clearly defined mission, objectives, policies, and strategies); (b) institutional competence; (c) institutional credibility.

Institutionalization
A process that impersonally establishes a structure, plan, program, project, or activity in the day-to-day operation of an organization.

Internal review
Evaluation of a research project, program, or organization that is organized and carried out by the management and staff of the unit. (See also internal program review).

Logical framework
Often called the *logframe,* it is a tool for planning, monitoring, and evaluating projects in the broader context of programs and national goals. It clarifies the logical links between project inputs and a hierarchy of objectives: direct outputs, broader purposes, and the ultimate goal.

Means of verification
The sources and methods used to obtain and assess information about the achievement of research objectives.

Metaevaluation
Critical assessment and overview of evaluation procedures and experiences. Metaevaluation is done to learn from past evaluations and improve future ones.

Mission
The offiCial statement of the reason for an organization's existence — its basic goals and purpose. (See also *strategic planning.*)

Objective
The expected output, purpose, or goal of a research effort; something towards which efforts are directed. Objectives may also be specific operational statements regarding the desired accomplishments of an activity. (See also *goal, output* and *purpose.*)

Objectively verifiable indicator
Specific measures of progress or results at a specific level of a project's hierarchy of objectives.

Ongoing evaluation
Evaluation carried out during implementation of an activity. It involves observing or checking on research activities and their context, results, and impact. Ensures that inputs, work schedules, and outputs are proceeding according to plan (in other words, that implementation is on course). It also provides a record of input use, activities, and results and warns of deviations from initial goals and expected outcomes. (See also *monitoring.*)

Operational planning
A process for defining what an organization intends to accomplish, how and when this will take place, and who will be held accountable.

Organizational analysis
Internal analysis carried out by gathering and assessing information on the inputs, processes, and products of an organization. The purpose is to identify strengths and weaknesses in relation to opportunities and threats posed by the external environment, and in relation to the organization's objectives.

Output
The specific product or service that an activity produces or is expected to produce. Used in the logical framework to refer to specific results for which the project manager may be held accountable, such as the release of a new maize variety. See also *goal*, *purpose* and *objective*.

Participatory management
Creating a culture of effective participation of an organization's members at all levels. It involves sharing ideas and responsibilities, and getting members' commitment to design and carry out activities that will contribute to institutional objectives and bring about desired institutional changes.

Peer review
Process by which the scientific merit (conceptual and technical soundness) of a research proposal, publication, or activity is evaluated by other scientists working in the same or a closely related field.

Planning
A process for setting organizational goals and establishing the resources needed to achieve them. It is also a way of building a consensus around the mandate, direction, and priorities of a research program or organization.

Policies
Major guidelines for reaching ends in accordance with priorities. Policies should be formulated after, or as a consequence of, the formulation of the organization's mission and objectives. Policies give direction to decisions on inputs and processes.

Products
Specific goods or services produced by an organization program, project or activity. (See also *outputs*.

Program
An organized set of research projects or activities that are oriented towards the attainment of common set of objectives. A program is not time-bound, as projects are, and programs are higher in the research hierarchy than projects.

Programming levels
The areas that encompass activities of an agricultural research institution, according to the specificity of the objectives. The two most common levels are projects and programs.

Project
A set of research activities designed to achieve specific objectives within a specified period of time. A research project is composed of a group of interrelated research activities or experiments that share a rationale, objectives, plan of action, schedule for completion, budget, inputs, outputs, and intended beneficiaries.

Project cycle
A framework for planning and managing projects. It is composed of distinct phases through which a project moves during its lifetime. Variations of the project cycle are used to manage large-scale investments, development-agency activities, and various kinds of research.

Project management
A framework for the systematic planning, implementation, monitoring, and evaluation of research projects and activities.

Purpose
The desired effect or impact of a project. (See also *goal, output,* and *objective.*)

Quality control
A set of planned and systematized activities to guarantee that the products and services of an institution will fulfill the expectations of the public, beneficiaries, and stakeholders.

Relevance
The appropriateness and importance of research activity's objectives in relation to broader (e.g. regional or national) goals or clients' needs.

Scenario
The simulation of a probable future situation, in the context of the institution's location, taking into consideration the interaction among economic, political, social, and cultural factors, and how these may affect the institution's ability to act.

Stakeholders
Groups whose interests are affected by research activities. The stakeholders of a research organization include staff members, farmers, and extension agents, among others.

Strategic planning
A process by which an organization builds a vision of its future and develops the necessary structure, resources, procedures, and operations to achieve it. The process is generally participatory, and based on analyses of the external environment, the organization, and "gaps". External opportunities and threats and internal strengths and weaknesses are assessed. This is followed by formulation of the organization's mission, objectives, policies, and strategies. Strategic planning is long-term in nature (e.g. for 10 or more years.) It serves as a base for tactical and operation planning. (See also *tactical planning* and *operational planning*.)

Strategy
A course of action involving a logical combination of actors, factors and actions chosen to reach a long-term goal or vision. It is important to distinguish policy from strategy. Policies are general guidelines to achieve given objectives. In addition, Strategies incorporate a logical sequence of steps. (See also *strategic planning*.)

Summative evaluation
A summary statement about the accomplishments, effectiveness, value, and impact of programs. Summative evaluations are made for accountability purposes and for policy-making.

Survey
A technique for gathering information from individuals or groups. It can be done by observing, administering questionnaires to, or having discussions with members of the group being surveyed.

Tactical planning
A process of organizational planning at the intermediate management level. The objectives, goals, policies, priorities, and strategies defined through tactical planning are for the medium term (generally 3-5 years); they are based on the strategic planning, and are the guidelines for the operational planning.

Appendix 9 Bibliography

References

AYRES, C. 1993. Planning, monitoring and evaluation in the research branch of agriculture Canada. Discussion Paper No. 93-08. International Service for National Agricultural Research: The Hague, The Netherlands.

BORGES-ANDRADE, J.E.; HORTON, D. 1993. Planning, monitoring and evaluation in EMBRAPA, Brazil. Discussion Paper No. 93-10. International Service for National Agricultural Research: The Hague, The Netherlands.

CERTO, S.C.; PETER, J.P. 1993. Administração estratégica: Planejamento e implantação de estratégia. Makron books do Brasil Editora Ltda.: Sâo Paulo, Brasil.

COLLION, M.H. 1989. Strategic Planning for National Agricultural Research Systems: An overview. Working Paper No.26. International Service for National Agricultural Research: The Hague, The Netherlands.

DAVID, F.R. 1988. La gerencia estratégica. Legis: Santafé de Bogotá, Colombia.

HOGG, D.R. 1994. Planificación, seguimiento y evaluación en el INTA, Argentina. **In**: Novoa B., A.R.; Horton, D. (eds.). Administración de la investigación agropecuaria: Experiencias en las Américas. Tercer Mundo Editores en asociación con ISNAR y PROCADI: Santafé de Bogotá, Colombia.

JOHNSON, B.B.; PAEZ, M.L.A.; FREITAS FILHO, A.; ARAUJO, J.D. 1991. Cenários Alternativos para o Planejamento Estratégico na EMBRAPA. **In:** Simpósio Nacional de Pesquisa de Administração en Ciência e Tecnologia- 16. Coletânea. PACTO/IA/FEA/USP: Rio de Janeiro, Brasil.

JOHNSON, B.B.; FREITAS FILHO, A.; PAEZ, M.L.A.; WRIGHT, J.; SANTOS, S.A.; ARAÚJO, J.D. 1991. Planejamento Estratégico em Instituiçâo de Pesquisa Agropecuária com estrutura descentralizada. **In:** Simpósio Nacional de Pesquisa de Administraçâo em Ciência e Tecnologia - 16. Coletânea. PACTO/IA/FEA/USP: Rio de Janeiro, Brasil.

MINTZBERG, H. 1987. Crafting Strategy. Harvard Business Review, 65(4): 66-75.

NOVOA B., A.R.; HORTON, D. 1994. Planificación, seguimiento y evaluación en las Américas: Una síntesis. **In**: Novoa B., A.R.; Horton, D. (eds.). Administración de la Investigación Agropecuaria: Experiencias en las Américas. Tercer Mundo Editores en asociación con ISNAR y PROCADI: Santafé de Bogotá, Colombia.

OHMAE, K. 1983. La mente del estratega: El triunfo de los japoneses en el mundo de los negocios. McGraw-Hill: Santafé de Bogotá, Colombia.

OLIVEIRA, D.P. REBOUÇAS. 1992. Planejamento estratégico: Conceitos, metodologia, práticas. Atlas: São Paulo, Brasil.

PAEZ, M.L.A.; FREITAS FILHO, A.; ARAÚJO, J.D. 1991. Avaliação dos objetivos da EMBRAPA na Década de 90: Opinião das instituições do ambiente externo. Empresa Brasileira de Pesquisa Agropecuária, Secretaria de Administraçao Estratégica: Brasilia, Brasil.

PFEIFFER, J.W.; GOODSTEIN, L.D.; NOLAN, T.M. 1985. Understanding applied strategic planning: A manager's guide. University Associates: San Diego, USA.

POSADA, R. 1994. Planificación, seguimiento y evaluación en CENICAFE, Colombia. **In**: Novoa B., A.R.; Horton, D. (eds.). Administración de la Investigación Agropecuaria: Experiencias en las Américas. Tercer Mundo Editores en asociación con ISNAR y PROCADI: Santafé de Bogotá, Colombia.

RUE, L.W.; HOLLAND, P.G. 1989. Strategic management: Concepts and experiences. McGraw-Hill: Nueva York, Estados Unidos de Norteamérica.

SASTOQUE, F.M. 1991. La prospectiva: Técnicas para visualizar el futuro. Legis: Santafé de Bogotá, Colombia.

SOUZA SILVA, JOSÉ DE. 1993. Instituições Públicas sustentáveis, Estudos Prospectivos e Estrategistas para a Construção do futuro. Revista Telebras 17, 57-71.

Literature Consulted

COLLION, M.H. 1993. Strategic planning. In: Horton, D.; Ballantyne, P., Peterson, W.; Uribe, B.; Gapasin, D. and Sheridan, K. Monitoring and evaluating agricultural research: A Sourcebook. CAB International in association with ISNAR. Wallingford, United Kingdom.

MULHOLLAND, M.E. 1993. CIPP evaluation model. In: Horton, D.; Ballantyne, P., Peterson, W.; Uribe, B.; Gapasin, D. and Sheridan, K. Monitoring and evaluating agricultural research: A Sourcebook. CAB International in association with ISNAR. Wallingford, United Kingdom.

ZAPATA, V. 1995. Training trainers in agricultural research management. International Center for Tropical Agriculture (CIAT), in association with ISNAR. Cali, Colombia.

Appendix 10 Overhead Transparencies

Cover

PLANNI-A Flowchart for Module 2
PLANNI-B Terminal objective
PLANNI-C The general logic of the Module

Sequence 1

PLANNI-1 Flowchart for Sequence 1
PLANNI-2 Contributions of the strategic approach
PLANNI-3 Characteristics of planning
PLANNI-4 The agricultural research organization as a production system

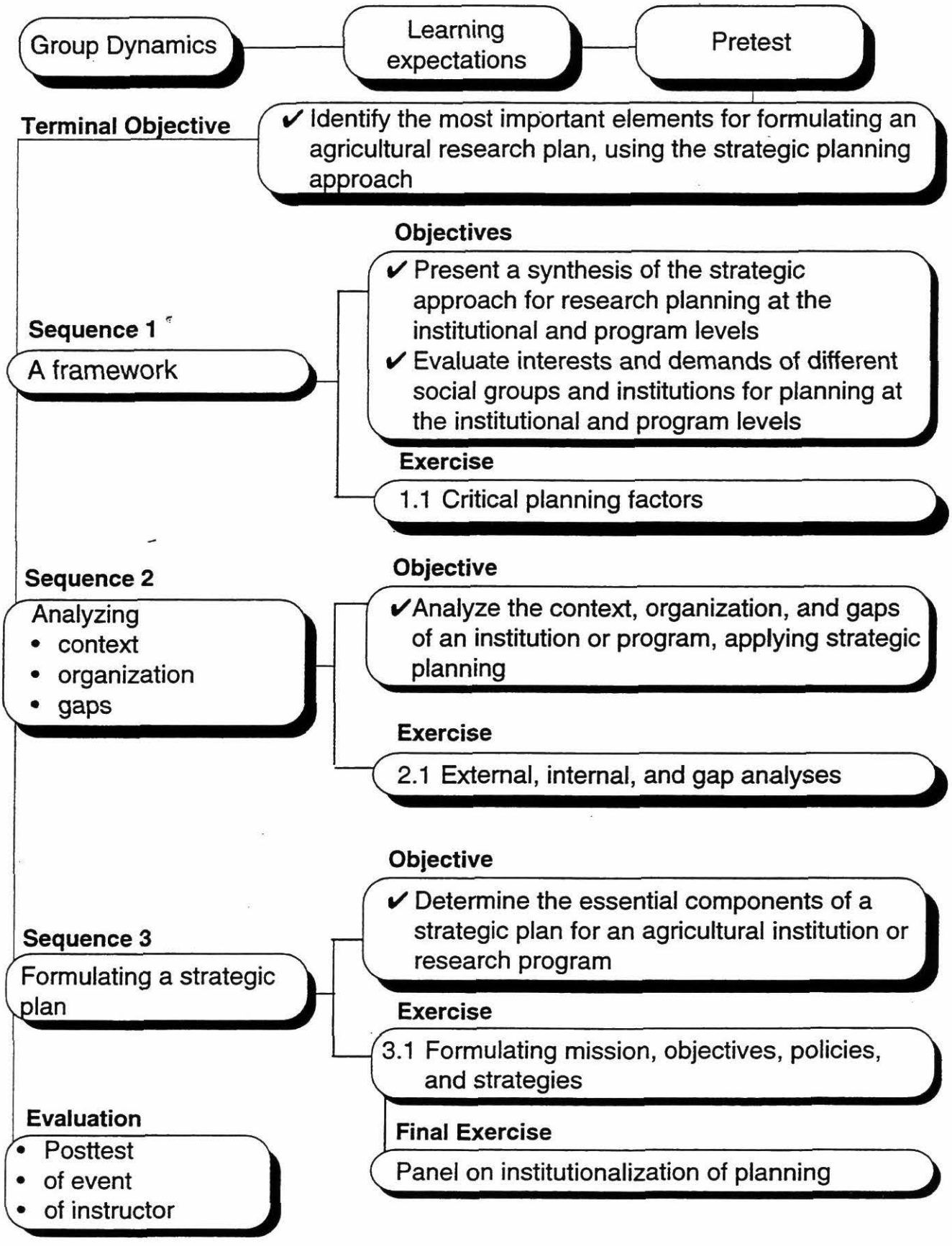
Sequence 2

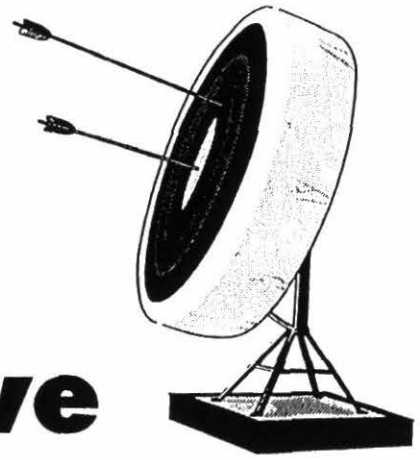
PLANNI-5 Flowchart for Sequence 2
PLANNI-6 Steps of environmental analysis
PLANNI-7 Steps of organizational analysis
PLANNI-8 Towards a strategic plan

Sequence 3

PLANNI-9 Flowchart for Sequence 3
PLANNI-10 The name of an organization is not enough to express its wishes and communicate them to others
PLANNI-11 Components of a mission statement
PLANNI-12 A target illustrates an objective to be achieve through the mobilization of inputs and processes
PLANNI-13 Hierarchical classification of EMBRAPA's objectives
PLANNI-14 Relationships between management level, objectives, plan, and time horizon
PLANNI-15 Policies and inputs towards achieving an objective
PLANNI-16 Sometimes researchers and external groups aim at different targets
PLANNI-17 Validation of objectives requires external consultation
PLANNI-18 Ten questions for selecting strategies
PLANNI-18.1 Ten questions for selecting strategies
PLANNI-19 Strategy formulation in terms of CIPP framework
PLANNI-20 Strategic planning process

Flowchart for Module 2



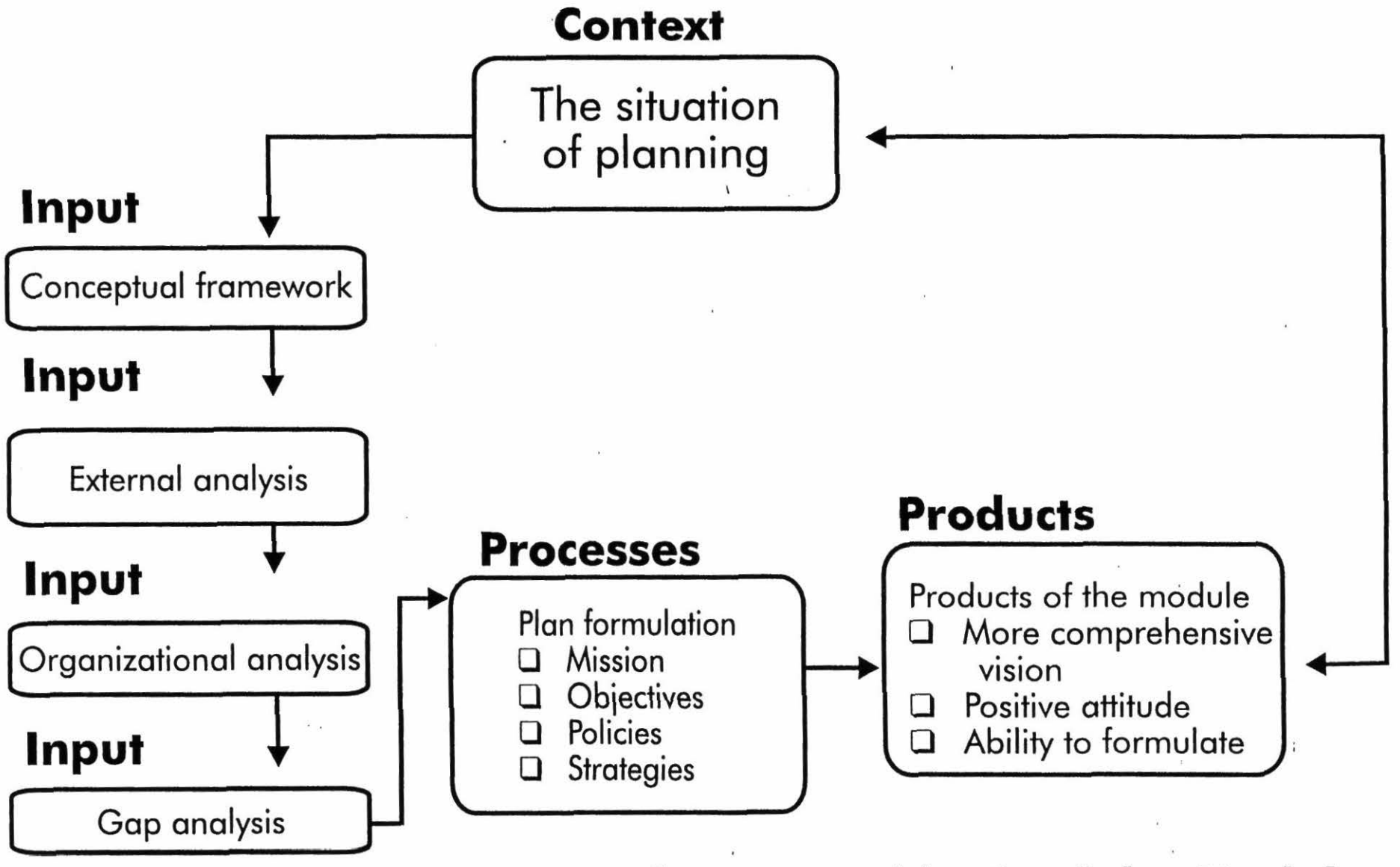


Terminal Objective

Identify the most important elements

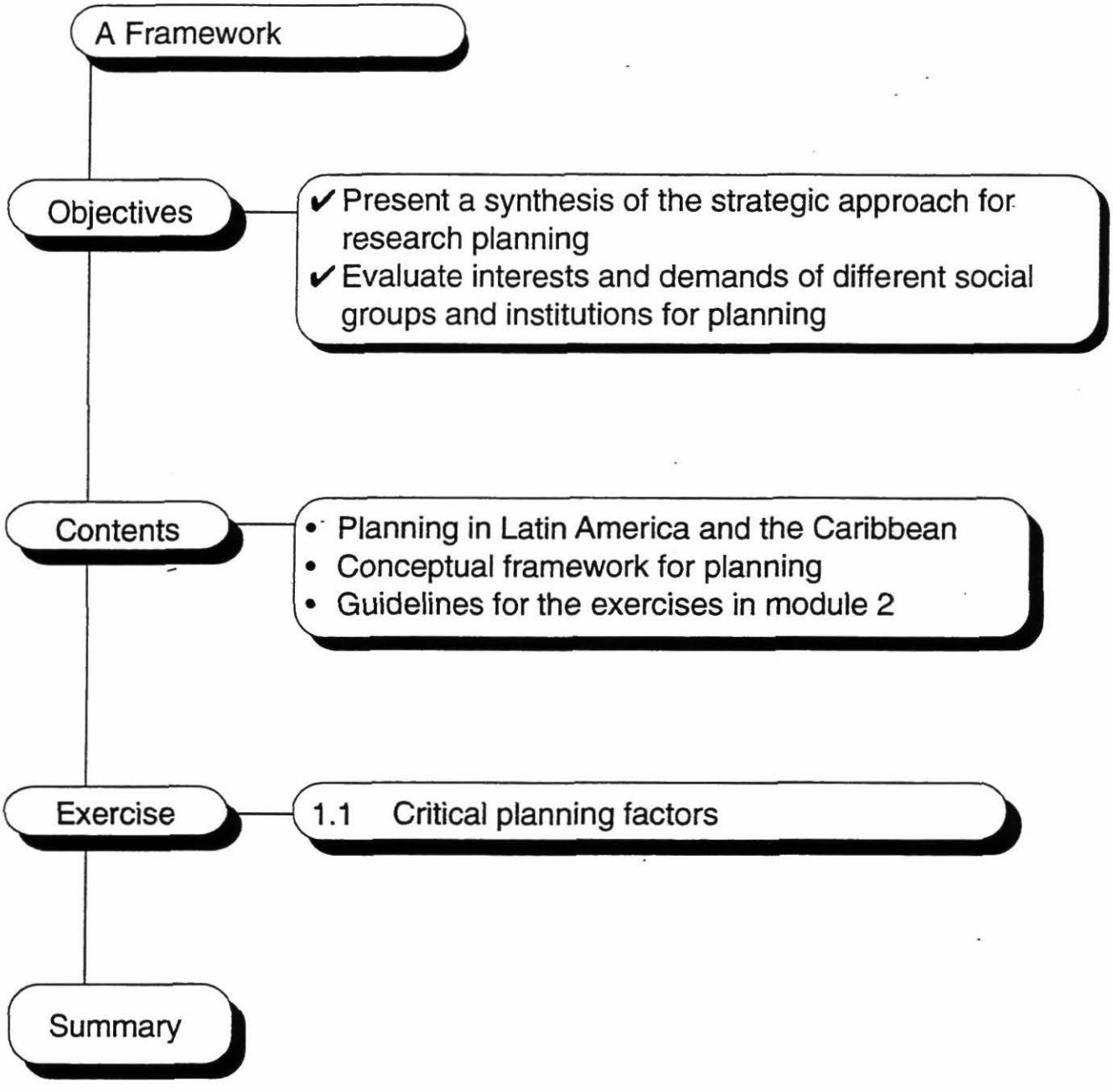
for formulating a plan for agricultural research,

using the strategic approach



The general logic of the Module

Flowchart for Sequence 1



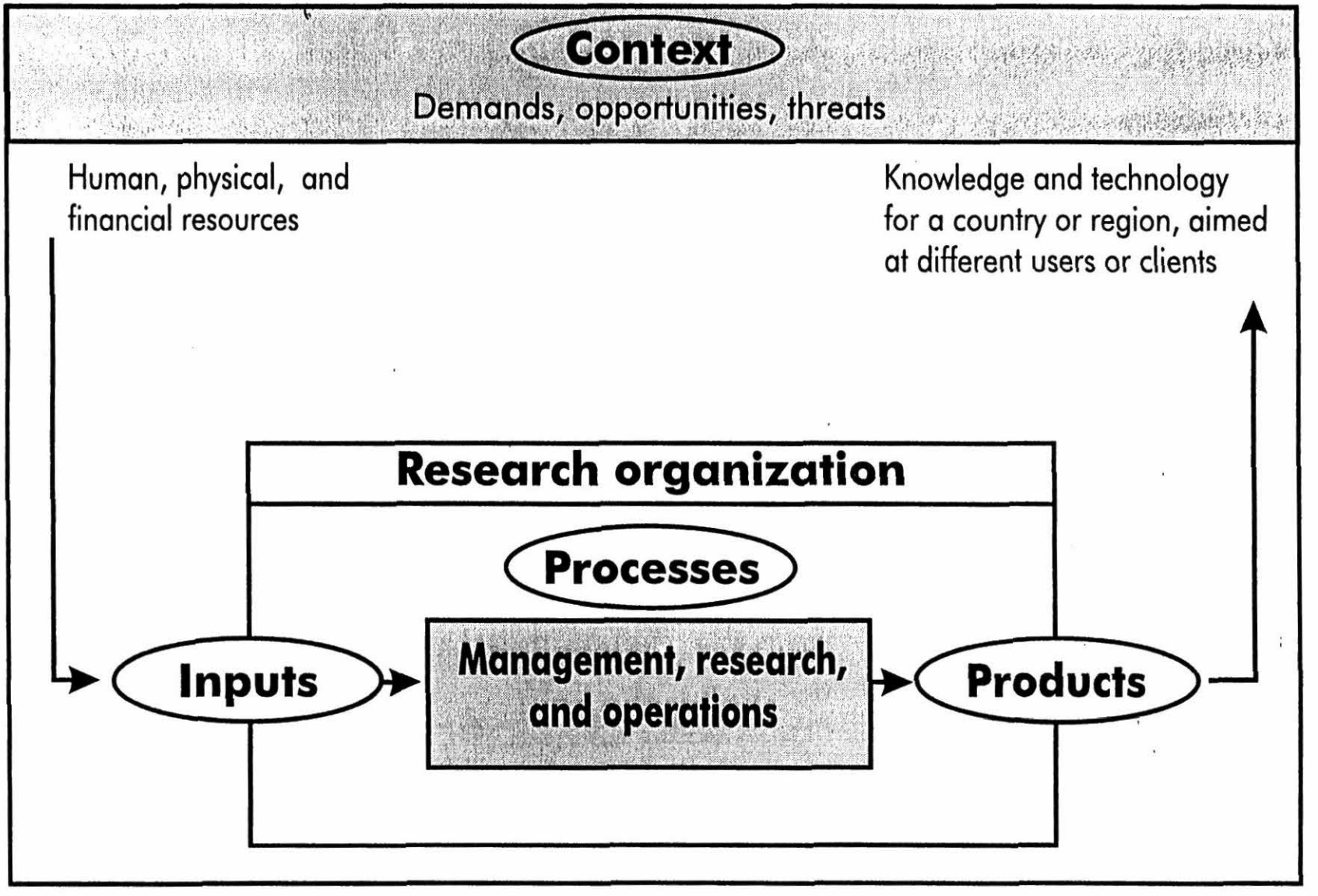
Contributions of the Strategic Approach

- ✔ Analysis of external environment
- ✔ Organizational analysis
- ✔ Gap analysis
- ✔ Review of mission and objectives
- ✔ Identification of client needs
- ✔ Identification of "intelligent investments"
- ✔ Building a strategic culture

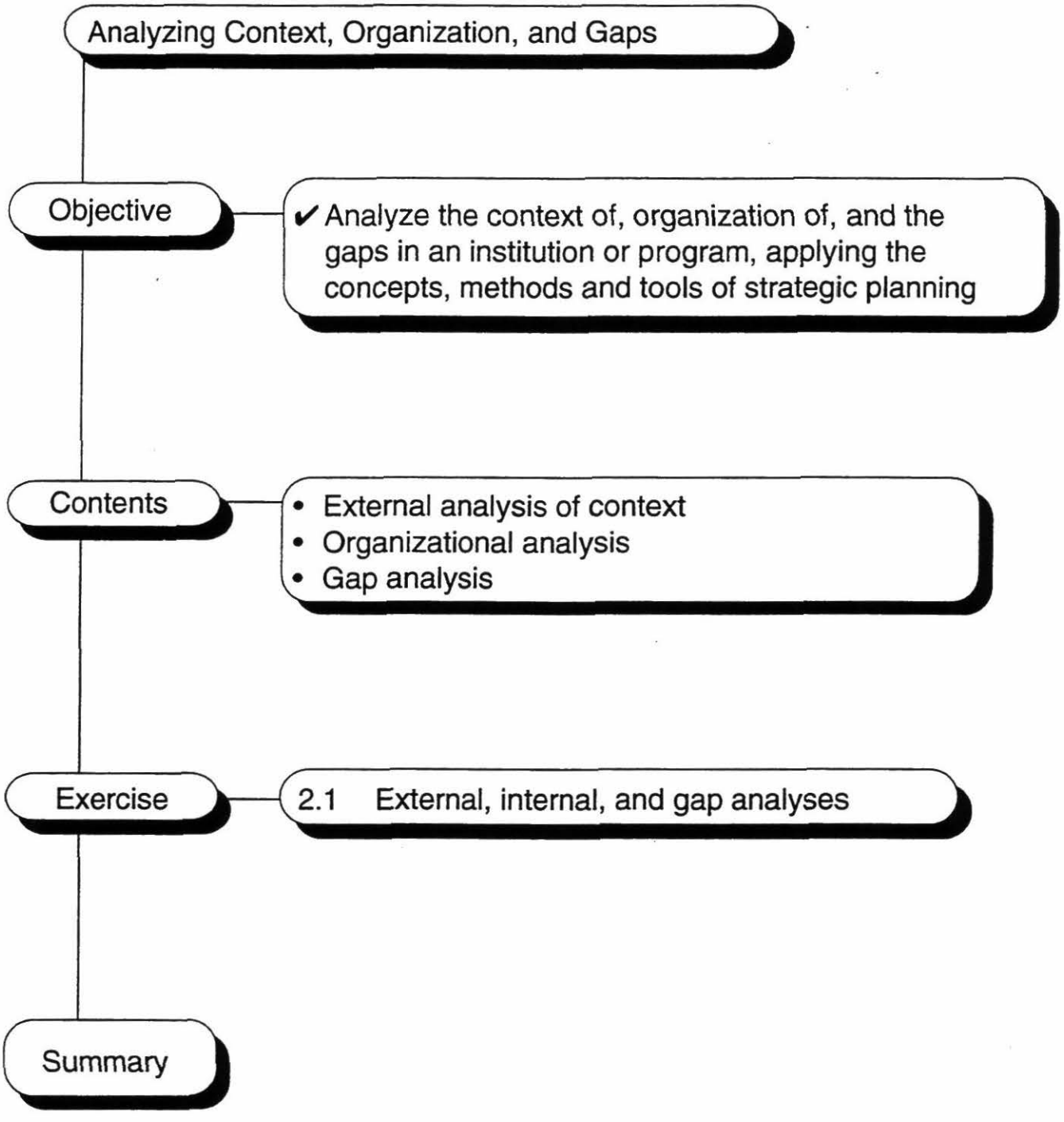
Characteristics of Planning

- ✔ Rational selection of options
- ✔ Coherence between objectives, policies and resources
- ✔ Strategies for reaching objectives
- ✔ Outlines of preferred future
- ✔ Elements to ensure political viability

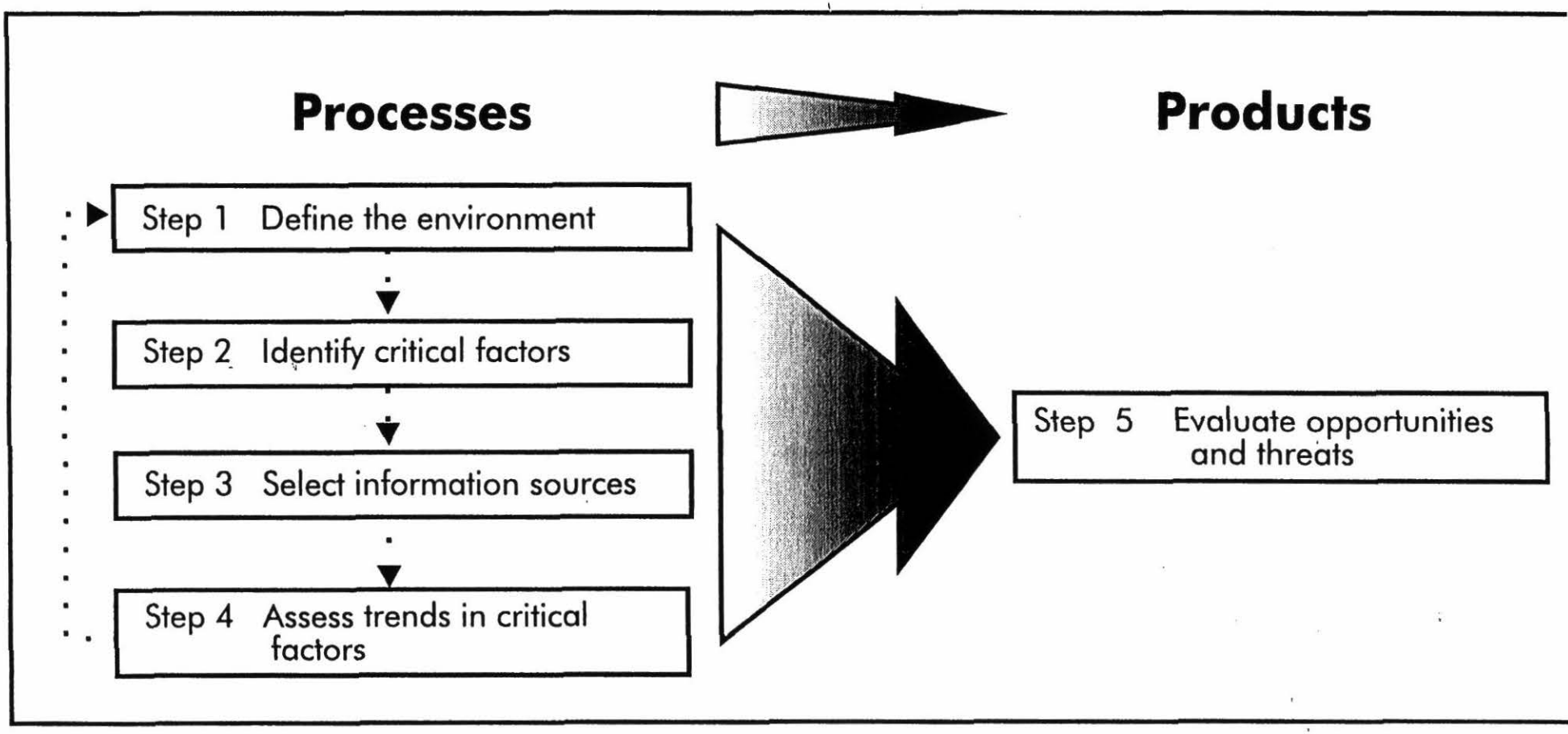
The Agricultural Research Organization as a Production System



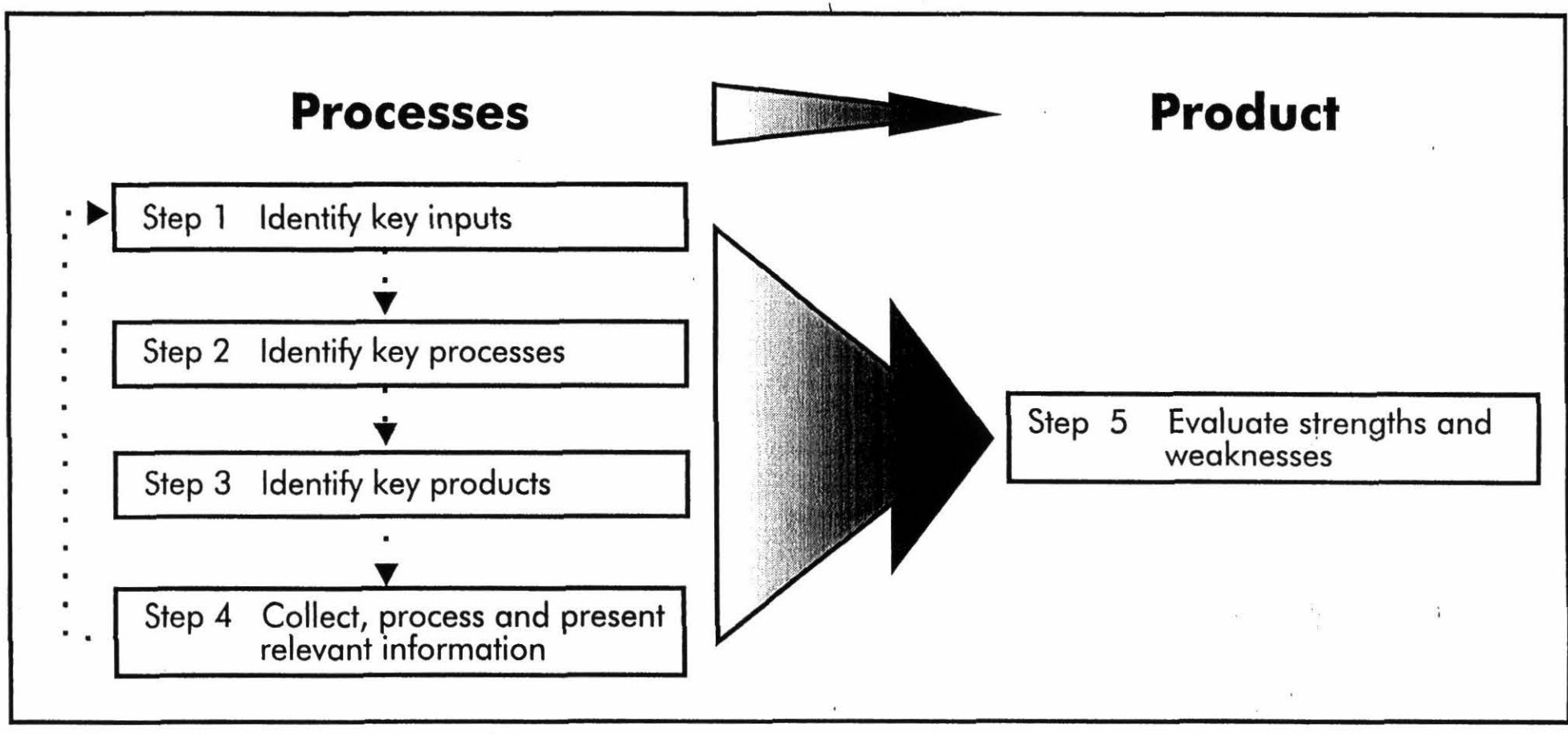
Flowchart for Sequence 2

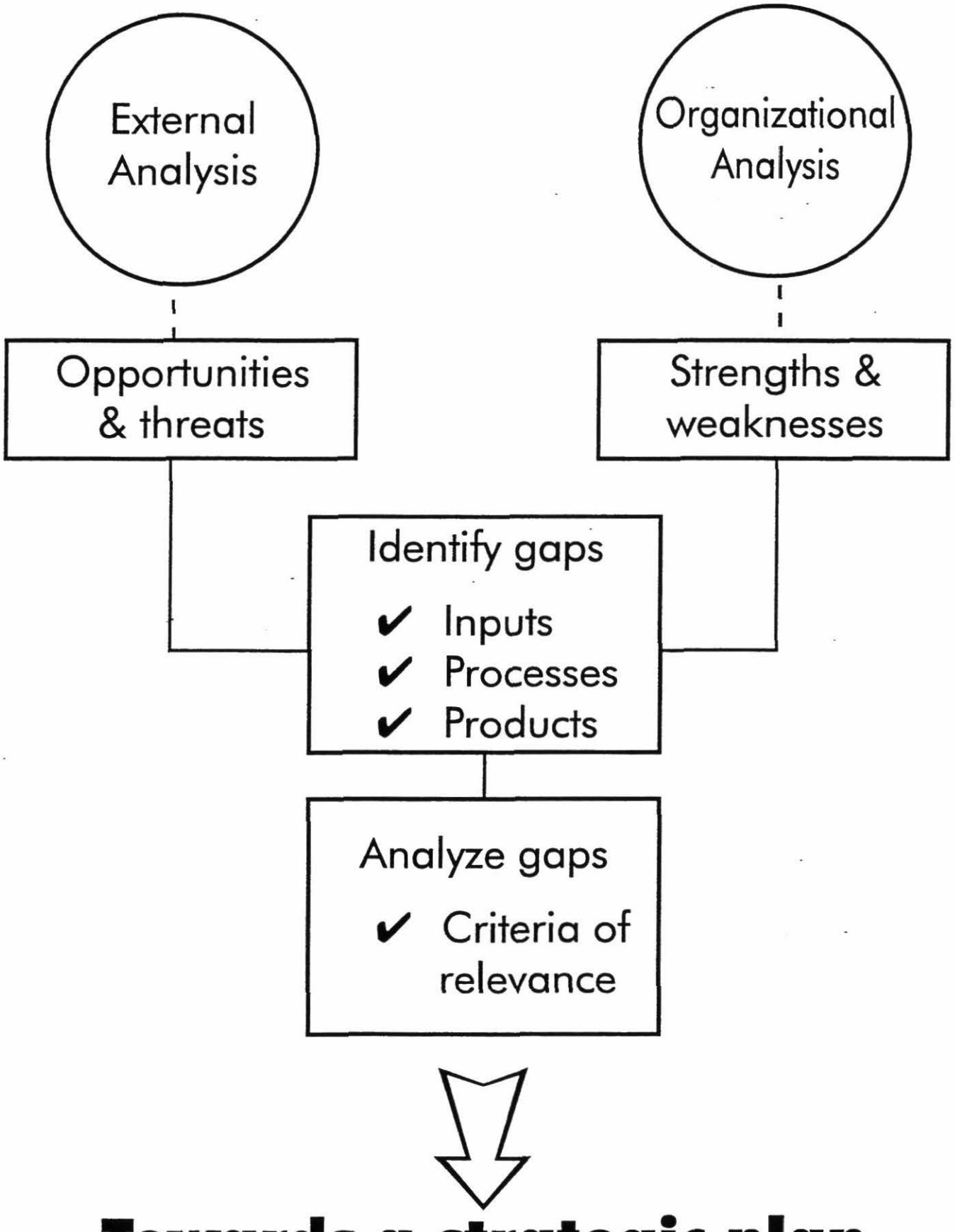


Steps of Environmental Analysis



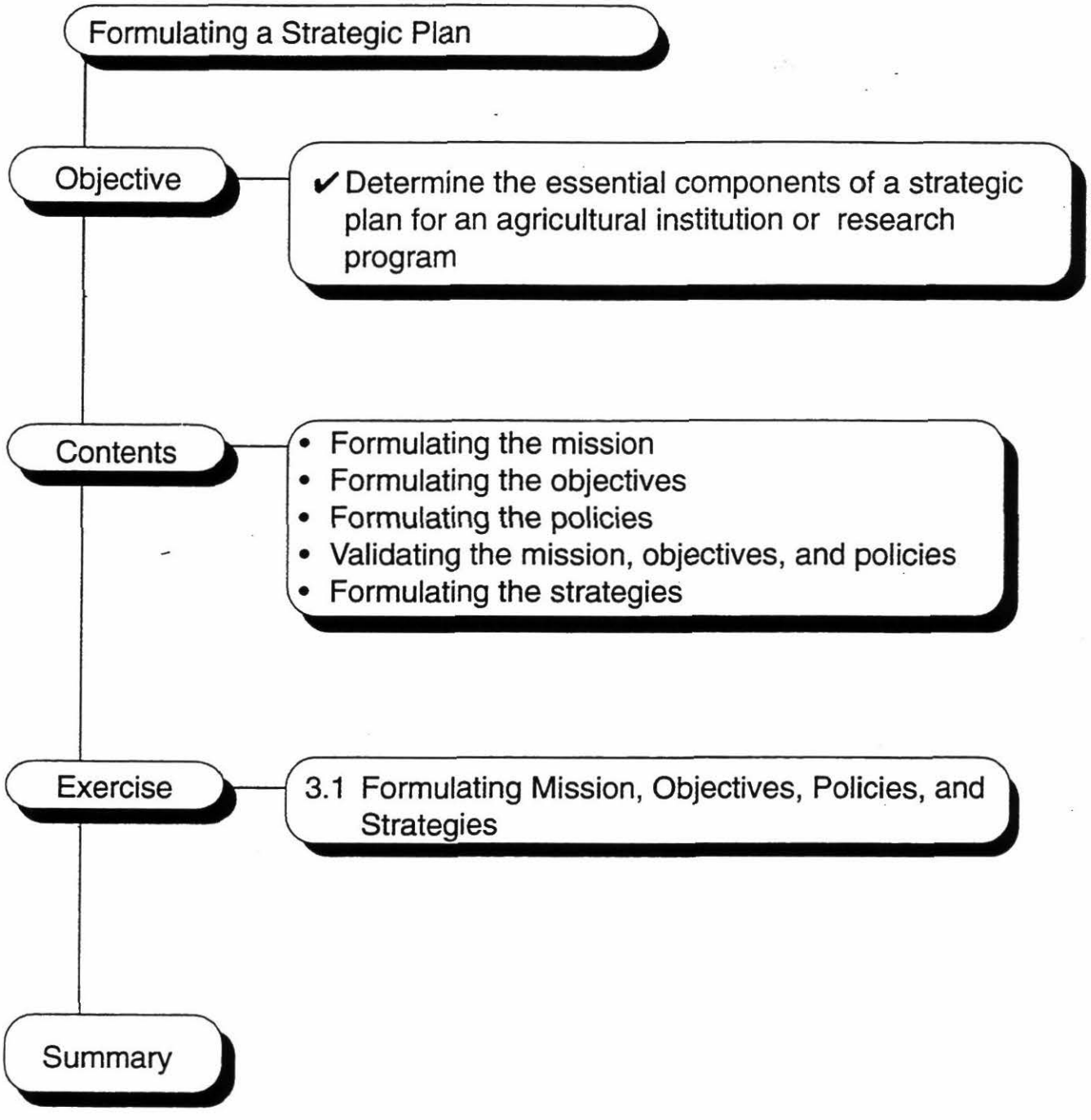
Steps of Organizational Analysis





Towards a strategic plan

Flowchart for Sequence 3

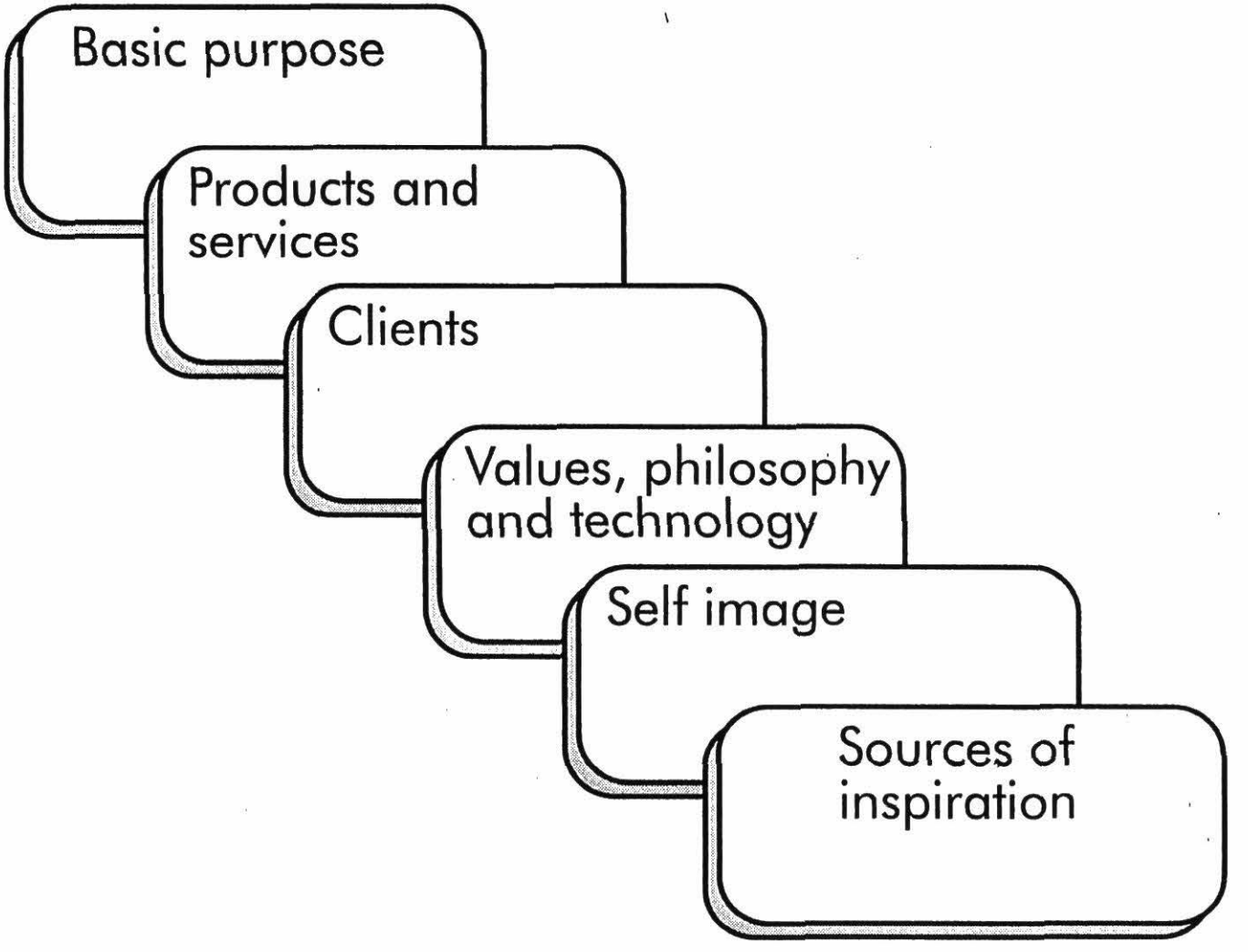


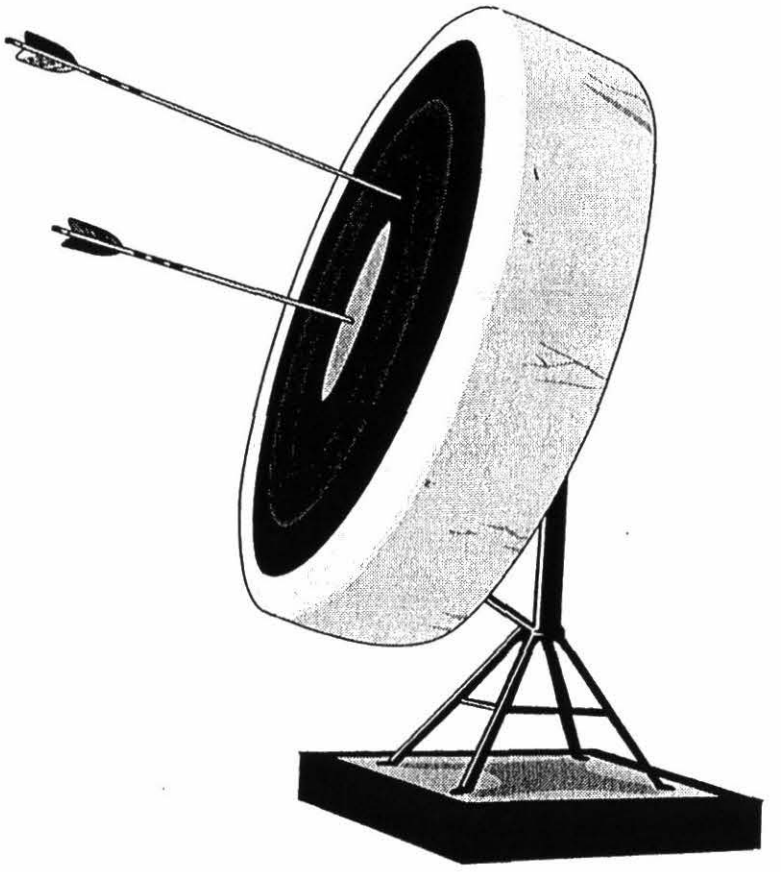
Center
for radioactive isotopes
and the biosphere

The name of an organization is not enough to express its wishes and communicate them to others

Needed: A mission statement

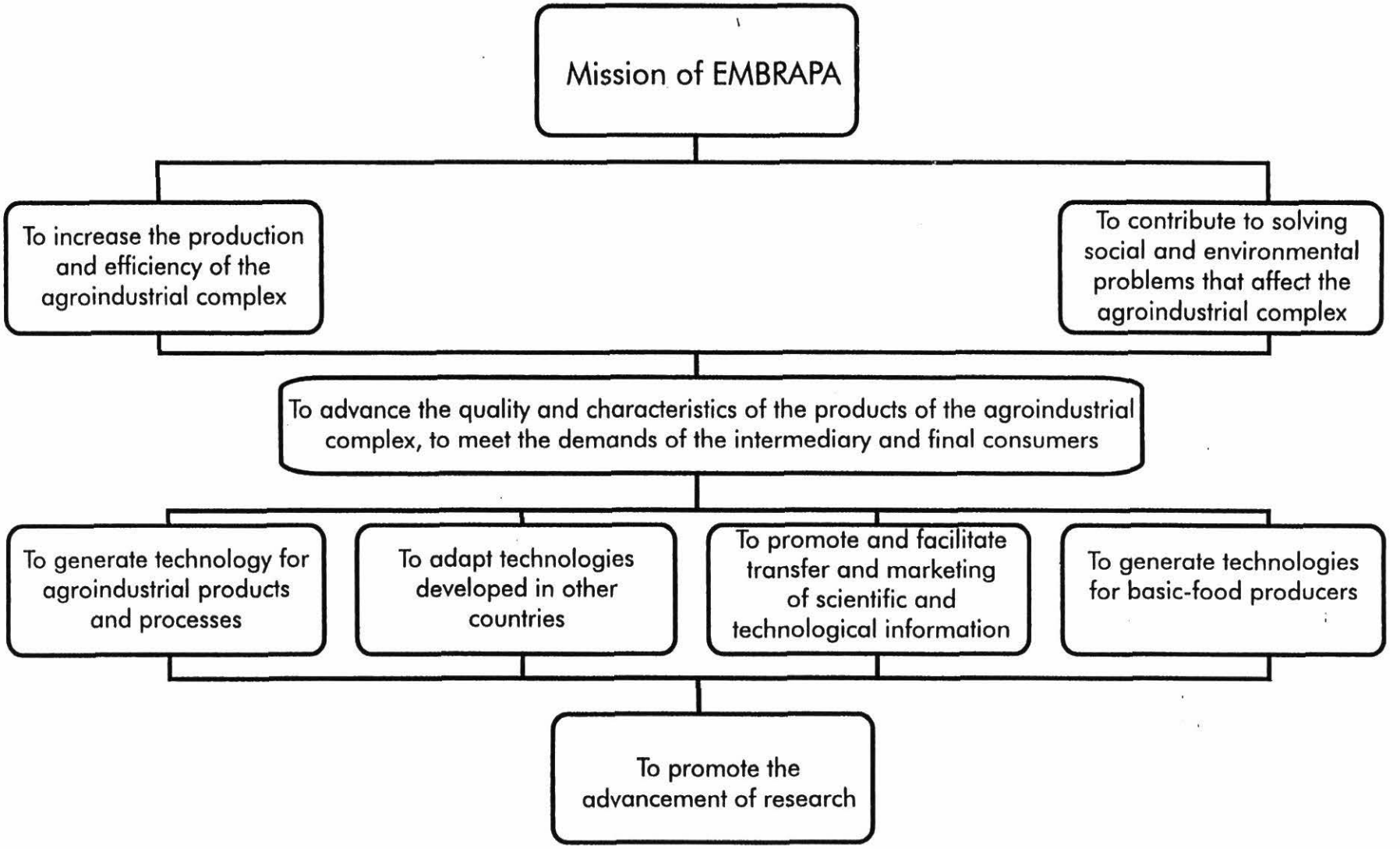
Components of a Mission Statement



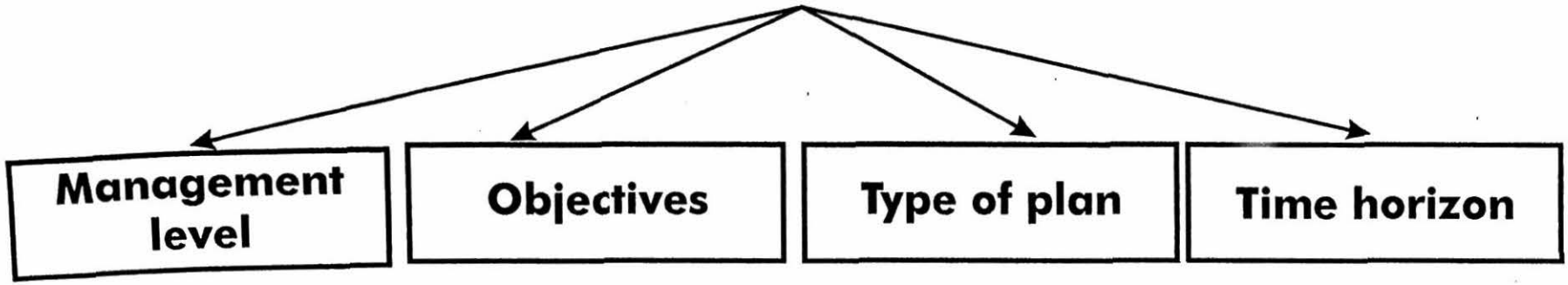


A target illustrates an objective to be achieved through the mobilization of inputs and processes

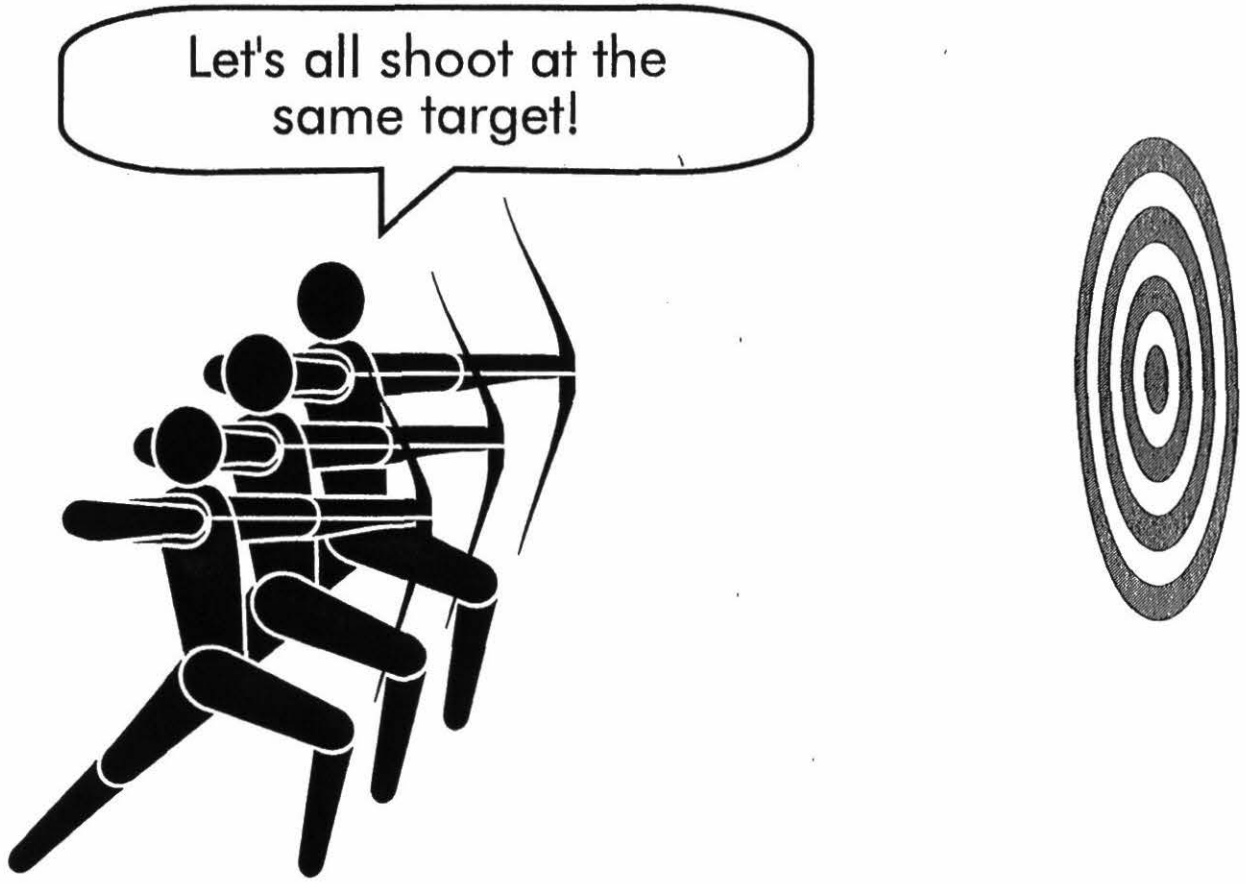
Hierarchical classification of EMBRAPA's objectives



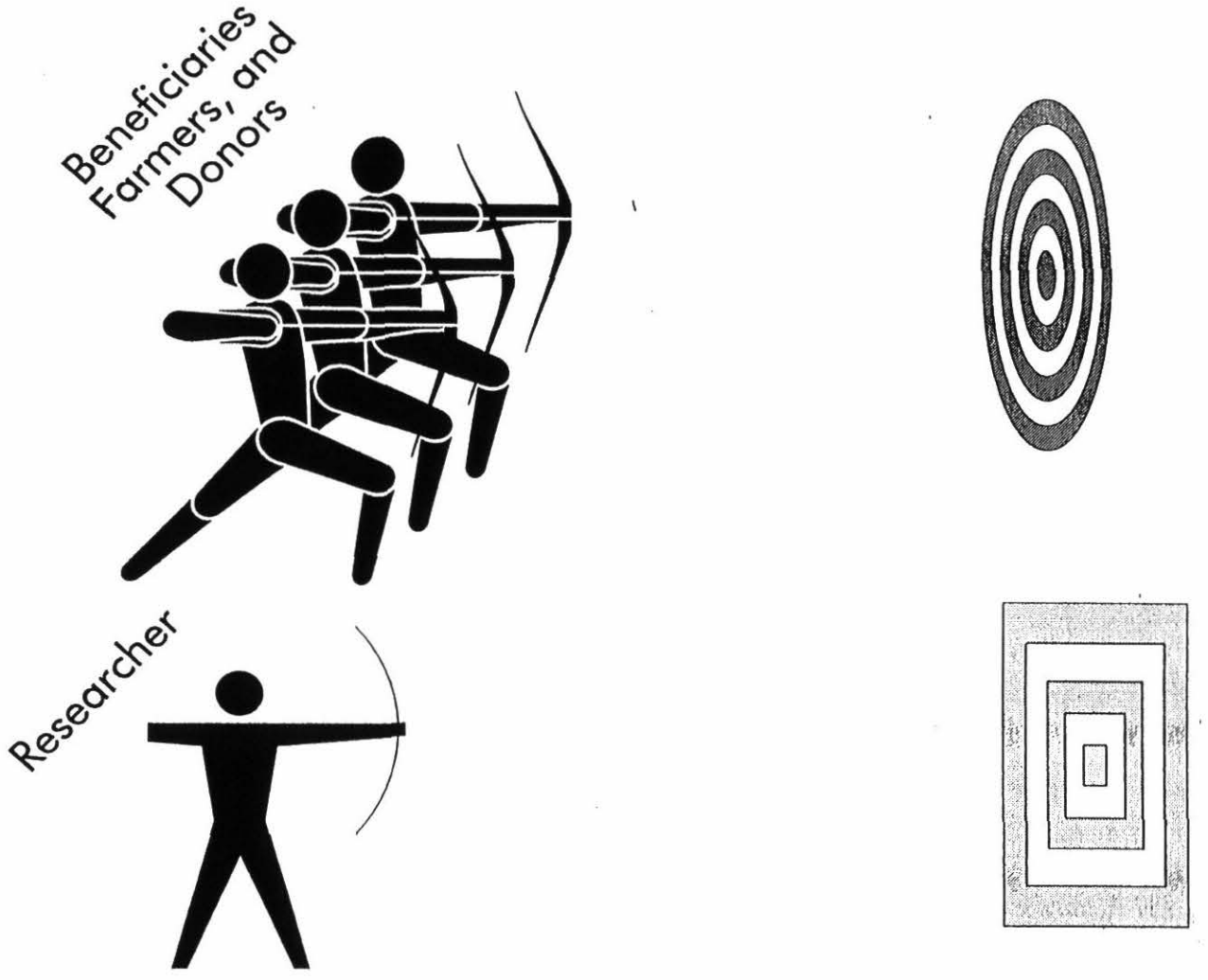
Relationships between:



Management level	Objectives	Type of plan	Time horizon
Top	Institutional	Strategic	Long
Middle	Functional	Tactical	Medium
Operational	Operational	Operational	Short



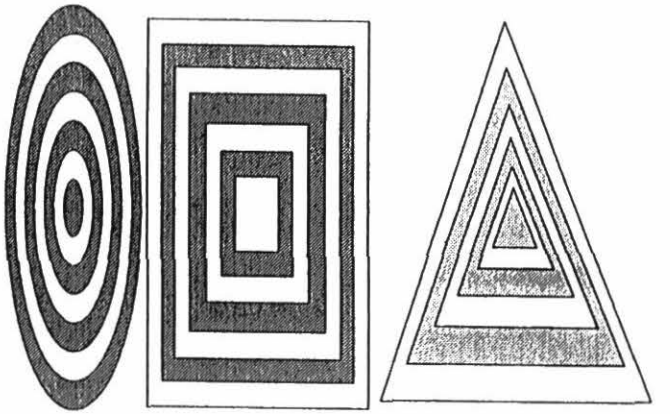
Policies are inputs towards achieving an objective



Sometimes researchers and external groups aim at different targets

Beneficiaries, donors,
and collaborators

Which target to aim at?



What is your opinion?

Validation of objectives requires external consultation

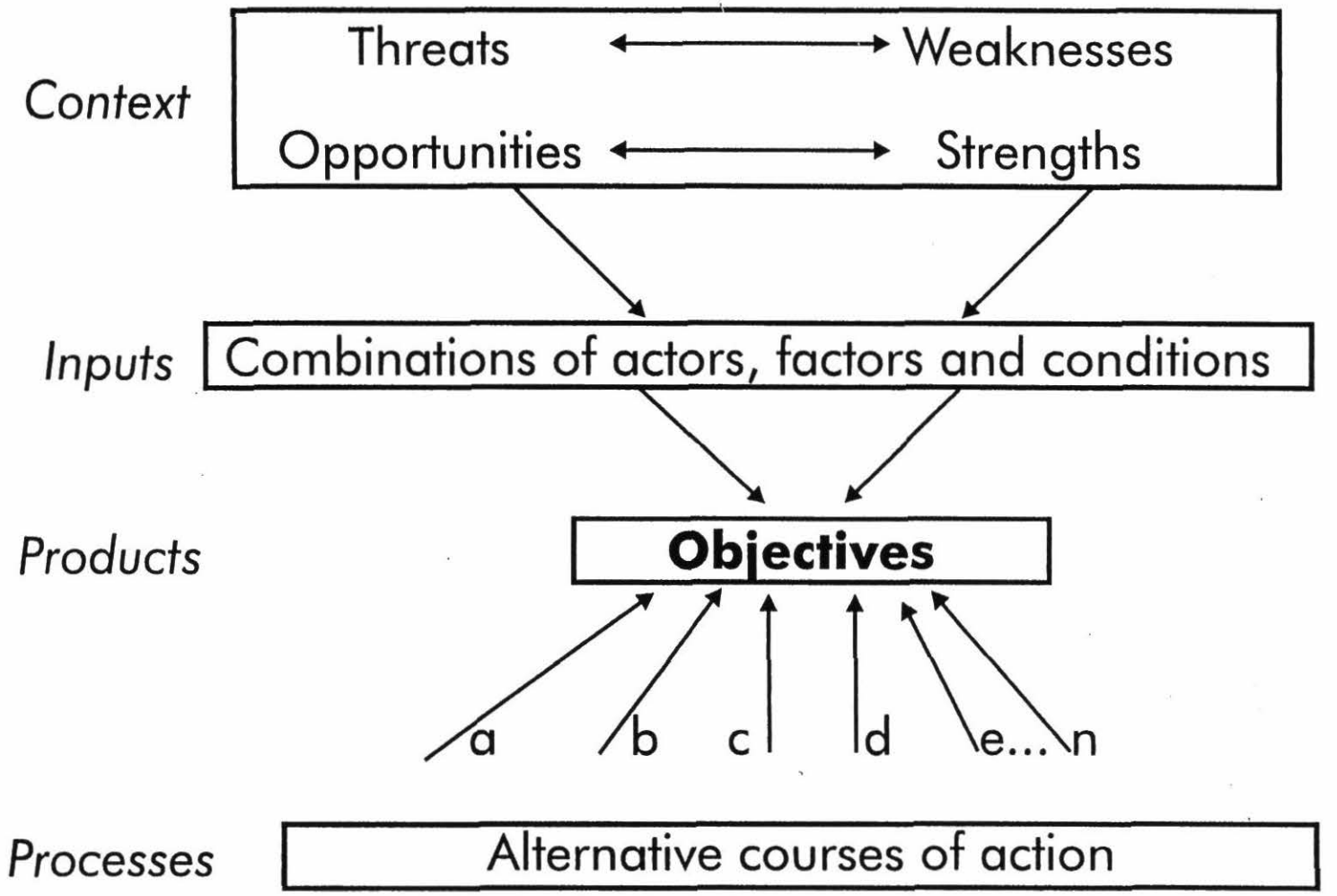
Ten Questions for Selecting Strategies

- What price will you pay to achieve the objective?
- What are limits of your actions to achieve it?
- What concessions would you make to achieve it?
- What initial concessions would you offer to gain support?
- What time limits are there?

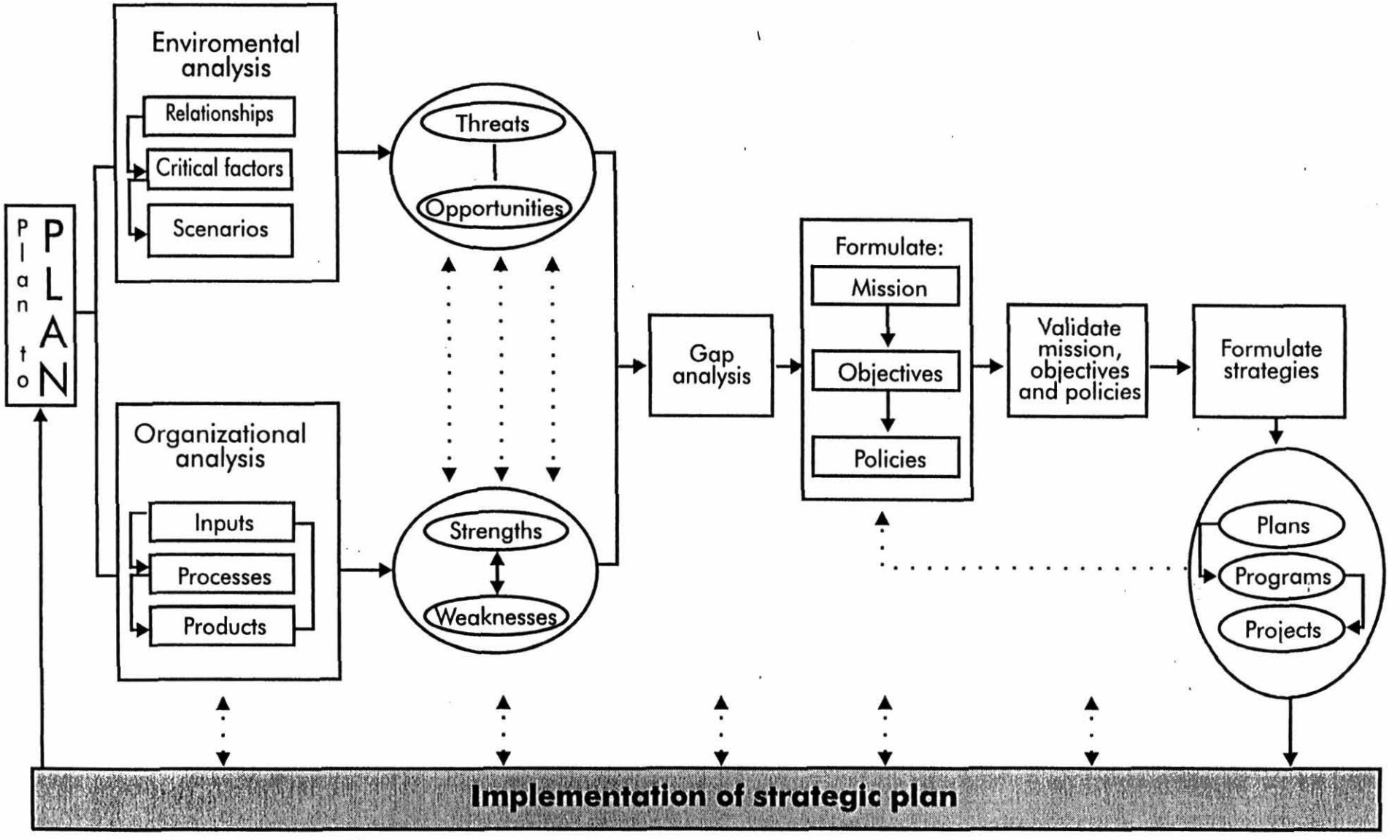
Ten Questions for Selecting Strategies

- What are the external critical factors?
- How will you respond to opposition?
- Who are the key actors involved?
- What would be the best way to start?
- What actions could threaten the strategy and how could you react?

Strategy formulation in terms of CIPP framework



Strategic planning process



isnar

The mandate of the International Service for National Agricultural Research (ISNAR) is to assist developing countries in bringing about lasting improvements in the performance of their national agricultural research systems and organizations. It does this by promoting appropriate agricultural research policies, sustainable research institutions, and improved research management. ISNAR's services to national research are ultimately intended to benefit producers and consumers in developing countries and to safeguard the natural environment for future generations.

ISNAR was established in 1979 by the Consultative Group on International Agricultural Research (CGIAR) on the basis of recommendations from an international task force. It began operating at its headquarters in The Hague, The Netherlands, on September 1, 1980.

ISNAR is a nonprofit autonomous institute, international in character, and apolitical in its management, staffing, and operations. It is financially supported by a number of the members of the CGIAR, an informal group of donor that includes countries, development banks, international organizations, and foundations. Of the 17 centers in the CGIAR system of international centers, ISNAR is the only one that focuses specifically on institutional development within national agricultural research systems..

CIAT Training Materials Section

The Training Materials Section is responsible for preparing CIAT's printed and audiovisual training materials, and works closely with national and regional agricultural research organizations in strengthening their training capacity.

The Section is made up of five agronomists and a complement of support staff under the direction of an adult educator. This team has developed participatory methodologies for training trainers and preparing training materials. The approach employs tested principles of adult education and modern desk-top publishing technology. The approach is used to work with researchers and subject-matter specialists in "translating" their technical knowledge into effective training materials and events.

During the last three years, the Section has produced around 50 modules and documents, like this one, for production training in cassava, beans, rice and pastures; for training in extension systems and techniques; and for training in agricultural research management. Most of these materials have been produced in Spanish; several of these have also been translated into English, Portuguese and French.