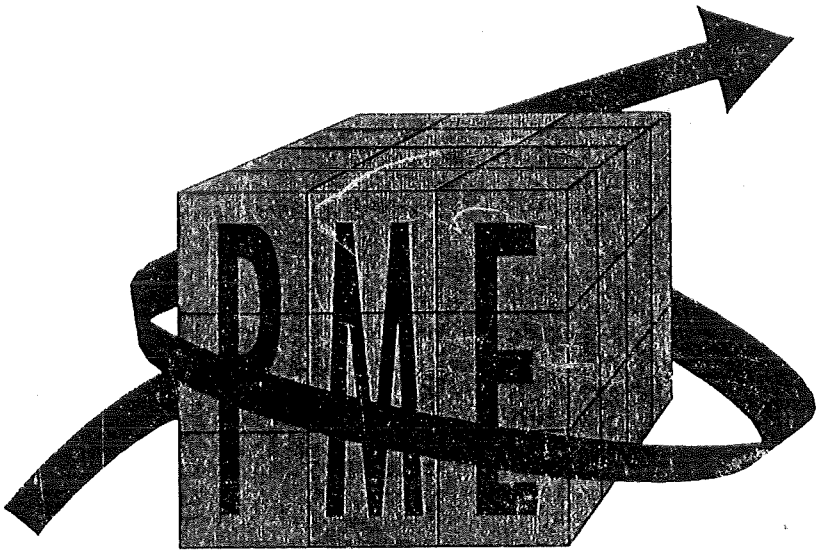
Training in Planning, Monitoring and Evaluation for Agricultural Research Management

Module 3
Monitoring



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for National Agricultural Research

1995

CIAT
Centro Internacional de Agricultura Tropical
International Center for Tropical Agriculture

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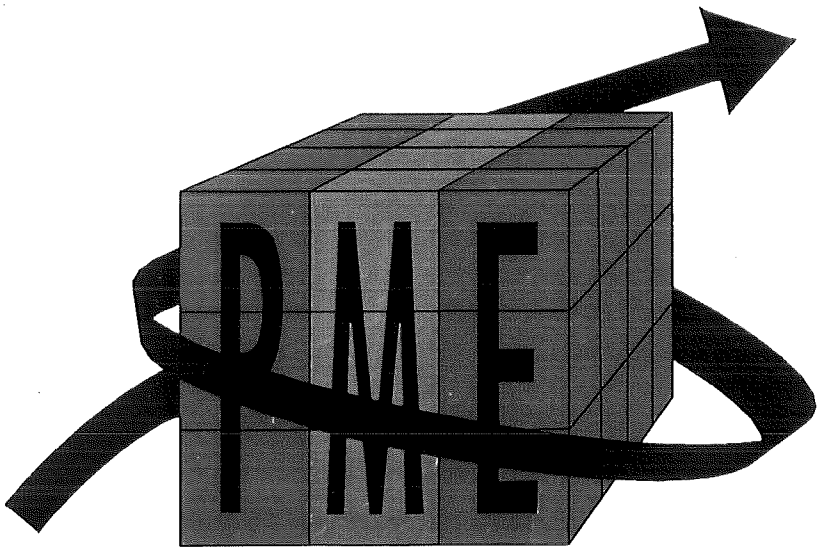

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Monitoring in Agricultural Research Management

IBTA
Bolivian Institute for
Agricultural Technology,
Bolivia

INIA
National Institute for
Agricultural Research,
Uruguay

INTA
National Institute for
Agricultural Technology,
Argentina

MAG
Ministry of Agriculture
and Livestock,
Costa Rica

1995

Module 3

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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.

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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 monitoring 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, Florencia Satizabal 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					Presentation of plans Closing	
		Preparation of actions plans					

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 and Learning Expectations

General Guidelines

The object of the following exercise is to stimulate participation and communication among participants, to become familiar with their expectations and to explore the relation that these may have with regard to the event's objectives.

Suggested time: 60 minutes

Instructions

All group members as well as instructors will participate.

- Before starting the exercise, the instructor will explain the purpose and the mechanics for exploring expectations.
- Each participant will receive a different color card and will form a group with those who have the same color card.
- Each group will elect a rapporteur to summarize the following:
  - presentations by group members.
  - group expectations of the event.
- Once the group has been organized, each member will introduce him/herself including information on:
  - his/her professional and personal background.
  - his/her main responsibilities and the activities in his/her institution.

  The rapporteur will take notes of each presentation, in order to make the presentation for the group members during the plenary session
- Then, each member will present his/her main expectations related to the event. These will be written down on a flipchart. Expectations will be discussed in order to arrive at a list of no more than four
- During the plenary session, each rapporteur will:
  - introduce group members.
  - summarize the group's expectations using the flipchart.
- The instructor will comment and summarize the group's expectations and will compare them with the objectives for the module or for the course.
- Finally, the instructor will formulate a series of recommendations on group work, using the list that follows.

  To make efficient use of group work.
  - Organize the group before starting work.
  - Clarify the task before starting discussion.
  - Distribute responsibilities among group members.

- Comply with the time to finishing the task.
- Control participation for that everyone can participate.
- Seek agreement among the group.
- Display respect for others' opinions.
- Do not allow prolonged discussions on the meaning of words.
- Do not allow one member of the team to take over.
- Do not allow personal antagonisms to arise.
- Do not allow the creation of unplanned subgroups within the team.
- Do not allow undisciplined behavior.

Resources

- Cards of 5 different colors (provided by the instructor).
- Markers.
- Paperboard.

Pretest

Instructor's Guidelines

- Before handing out the questionnaire, make sure participants understand that this pretest does not try to "evaluate" their knowledge of research management principles and practices. It merely gives them an opportunity to check their level of understanding of PM&E. Likewise the complete tests will serve as a baseline for comparison with a posttest after the module has been completed.
- Hand out the questionnaire to the participants.
- When all the participants have finished filling out the questionnaire, show them the correct answers (on flip chart or overhead) so each participant can compare his or her responses with those you provided.
- Briefly discuss doubts the participants may have regarding the answers that differ from the ones you presented, without going into detail. Tell them that they will have a chance to go back to the questions as the module develops.

Pretest

Participants' Guidelines

Your answers to this questionnaire will help you determine your entry level to the topic of monitoring in agricultural research management.

Time to respond:
30 minutes

1. In your opinion, what are the main characteristics of a good agricultural research monitoring system? _____

2. How do you think you can judge the effectiveness of a monitoring system for agricultural research? _____

3. What are the main phases of an agricultural research project?

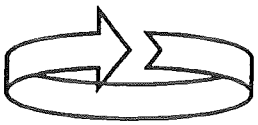
4. What elements need to be included in the formulation of an agricultural research project in order to monitor it? _____

5. Among the monitoring instruments used in your institution, which do you consider are most useful and why? _____

6. Which problems in your institution's research monitoring system would you like to solve? _____

Pretest - Feedback

Instructor's Guidelines



When the time is up for the pretest, do the following:

- Present alternative responses to each item
- Allow the participants to compare their answers with those of others
- Comment briefly on the answers

The following elements are related to each question and help to determine whether the answers correspond to the question.

1. The main characteristics of a good monitoring system for agricultural research are the following:
   - Supports decision making, at different levels, on the activities being conducted.
   - Is integrated with planning and evaluation.
   - Is a source of information and documentation on research activities for preparing reports and evaluations, and for planning.
   - Collects and provides information on objectives, needs, activities, resources, and research results.
   - Motivates and guides scientists towards priority objectives.
   - Is accepted by researchers and management because it produces more benefits than costs.
2. The effectiveness of a monitoring system can be judged on the basis of the usefulness of the information it generates for decision making, for preparing reports, and for subsequent evaluations.
   The requirements for a monitoring system must cover the following subjects:
   - Participation methodologies.
   - Degree of decentralization.
   - Minimum bureaucracy.
   - Low cost.
   - Usefulness for decision-making.
   - Appropriate presentation of reports.
   - Documentation of research.
   - Motivation and orientation of technical personnel.

Fulfilling these requirements will help decision makers to understand the information clearly and be able to make the corresponding decisions.

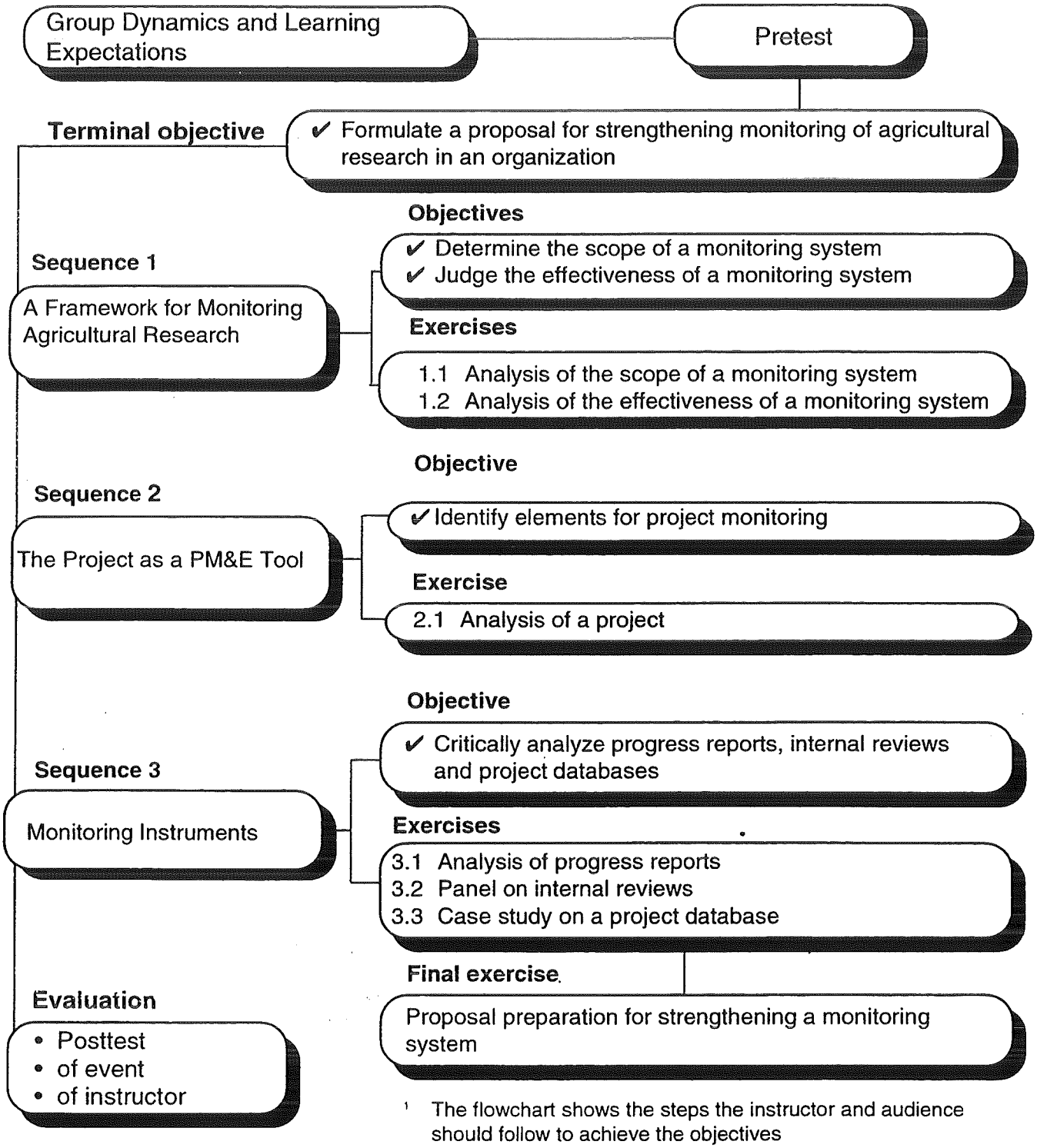
3. An appropriate tool for identifying the main phases of an agricultural research project is the "project cycle". The stages of the project cycle are closely interrelated and follow a logical progression of activities. This logic and the importance of each of the phases or stages can vary according to the project's nature. These phases or stages are the following:
   - Identification of project areas and objectives.
   - Preparation of research proposals.
   - Revision of research proposals.
   - Approval of proposals and funding.
   - Carrying out and monitoring of research.
   - Evaluation of project and its impact.
4. For monitoring, a project's formulation must include the following elements:
   - Diagnosis of the initial situation and description of the main problems requiring solution.
   - General and specific objectives.
   - The main assumptions which condition the achievement of objectives.
   - Strategies, methodologies, and activities for project execution
   - Indicators to be used as the basis for monitoring and evaluating research progress.
   - Means for verifying these indicators.
5. The following are among the main monitoring instruments: introductory, quarterly, progress and annual reports; internal program or project reviews or meetings; field visits; internal technical seminars; data bases of human resources, financial resources, and projects; technical newsletters; and trials and meetings with producers associations and other interest groups.

   The usefulness of these monitoring instruments can be judged on the basis of criteria such as the following:
   - Their value as mechanisms to achieve quality control of research, its activities, and products.
   - Its functional use as a communication means for those interested in research and its results.
   - Its usefulness for communicating between the administrative level and the remaining levels of the organization, institution, or center. These monitoring instruments serve as the basis for decision taking. They allow for adjustments while the activities are being conducted.

- Its usefulness as a link between planning and evaluation activities. The instruments provide basis for making planning more efficient at all levels of the system.

6. Solutions proposed by each participant for the monitoring system in his/her institution may refer to the following aspects:
   - Contributions to the integration and articulation of activities within a PM&E system.
   - Support for the development or application of instruments for the organization of the monitoring process, which enable the flow of information among the different hierarchical levels of the organization.
   - Contributions to the development or application of simple and effective instruments for conducting monitoring and the generation of information for making decisions on time adapted to the different needs and different audiences.

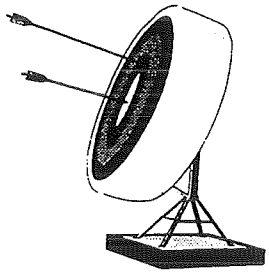
Flowchart[1] for Module 3



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

Objectives of Module 3

Terminal Objective



After finishing studying this module, participants will be able to:

✔ Formulate a proposal for strengthening monitoring system in their organizations, incorporating knowledge on methods and strategies presented in this module.

To fulfill the above objective, participants must be capable of:

Sequence 1 Objectives

✔ Determine the scope of a monitoring system, in relation to the decision-making levels and the types of information to be obtained.

✔ Judge the effectiveness of a monitoring system using principles and criteria specified in this module.

Sequence 2 Objective

✔ Identify the elements required for monitoring a project, using the project cycle and the logical framework.

Sequence 3 Objective

✔ Critically analyze progress reports, internal reviews and project databases as monitoring instruments.

Introduction to Module 3

The function of agricultural research monitoring is to provide useful information on work in progress for management and accountability purposes. Basically, monitoring is a participatory and decentralized analysis of agricultural research in progress; in relation to its context, objectives, expected results, and allocated resources. Monitoring is conducted to foresee deviations, problems, and opportunities; to guide the process; and to train and provide backup for the researchers, administrators, managers, and board members of an institution, by providing information for adequate and timely decision making at each level of the organization.

This monitoring assumes not only a set of concepts, methods, and techniques, but also an attitude that has important implications for the institutional culture.

Monitoring is a part of an integral planning and evaluation process (PM&E). In this sense, this module is part of a series oriented toward integral training in PM&E for managing agricultural research. Nonetheless, it has been designed in such a way that it can also be used to satisfy specific training needs in agricultural research monitoring.

To construct the basic logic of this module, the CIPP model has been used, see Figure 1. (Mulholland, 1993). First, an analysis is made of the **Context**, dealing with the status of agricultural research monitoring in the region. As **Input,** participants are given a conceptual framework for monitoring, with special emphasis on the strategic approach for research management, and on the scope and effectiveness of a monitoring system. For the **Process**, emphasis is put on the project as a level of analysis, even though that is provided can be applied to other programming levels.

The process includes the management cycle and the logical framework as tools for formulating projects that facilitate subsequent monitoring. A detailed analysis is made of three relevant procedural instruments: progress reports, internal reviews, and project database. The main **product** expected in developing the module is that participants should be able to elaborate proposals for strengthening and improving the effectiveness of the monitoring system in their institutions.

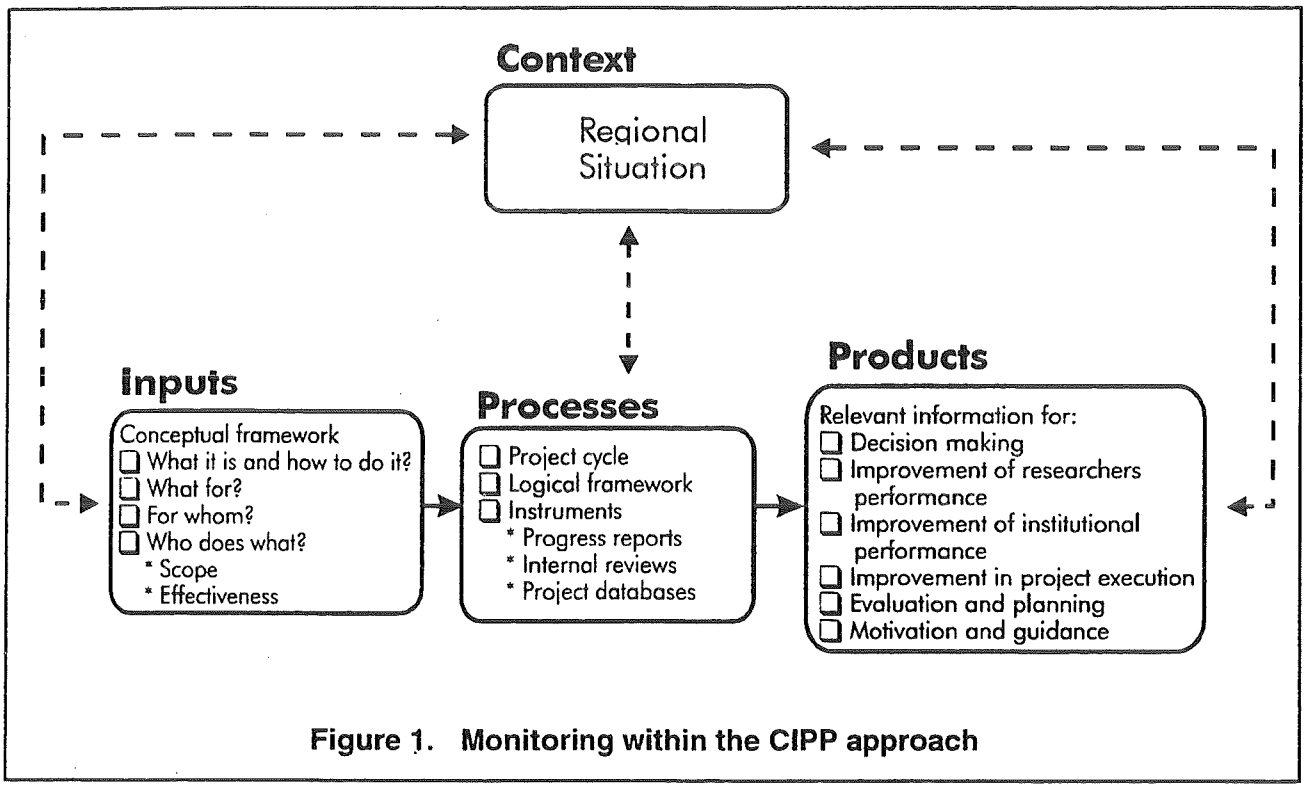


Figure 1. Monitoring within the CIPP approach

From the point of view of the learning strategy, the module has been divided into three instructional sequences. **Sequence 1** describes the status of monitoring in the region on the basis of 13 case studies conducted in 1992 (Novoa and Horton, 1994). A conceptual framework is provided for monitoring agricultural research. It explains what monitoring is, why it is conducted, for whom, the information it puts together, and the way this information circulates. Criteria are specified for analyzing the scope of a monitoring system and elements are provided for organizing the system and analyzing its effectiveness. The main criterion of effectiveness is the usefulness of the information collected, generated, and disseminated. This information must support decision making, research documentation, and the orientation of researchers.

Sequence 2 deals with formulating the research project, since this is the key requirement of agricultural research management. Hovewer, the subject matter is applicable at the program level. At the operational level, the project links PM&E. The following is an explanation of what a project is and an analysis of the project cycle. The following phases can be distinguished: problem identification; the preparation of a proposal; resource revision, approval, and assignment; implementation and monitoring; and the evaluation and dissemination of results. As adequate

monitoring of the project can only be done if it has been well formulated, an analysis is made of the logic behind a project during its formulation phase. The logical framework is introduced as an instrument to facilitate the project's coherence analysis and subsequent monitoring and evaluation.

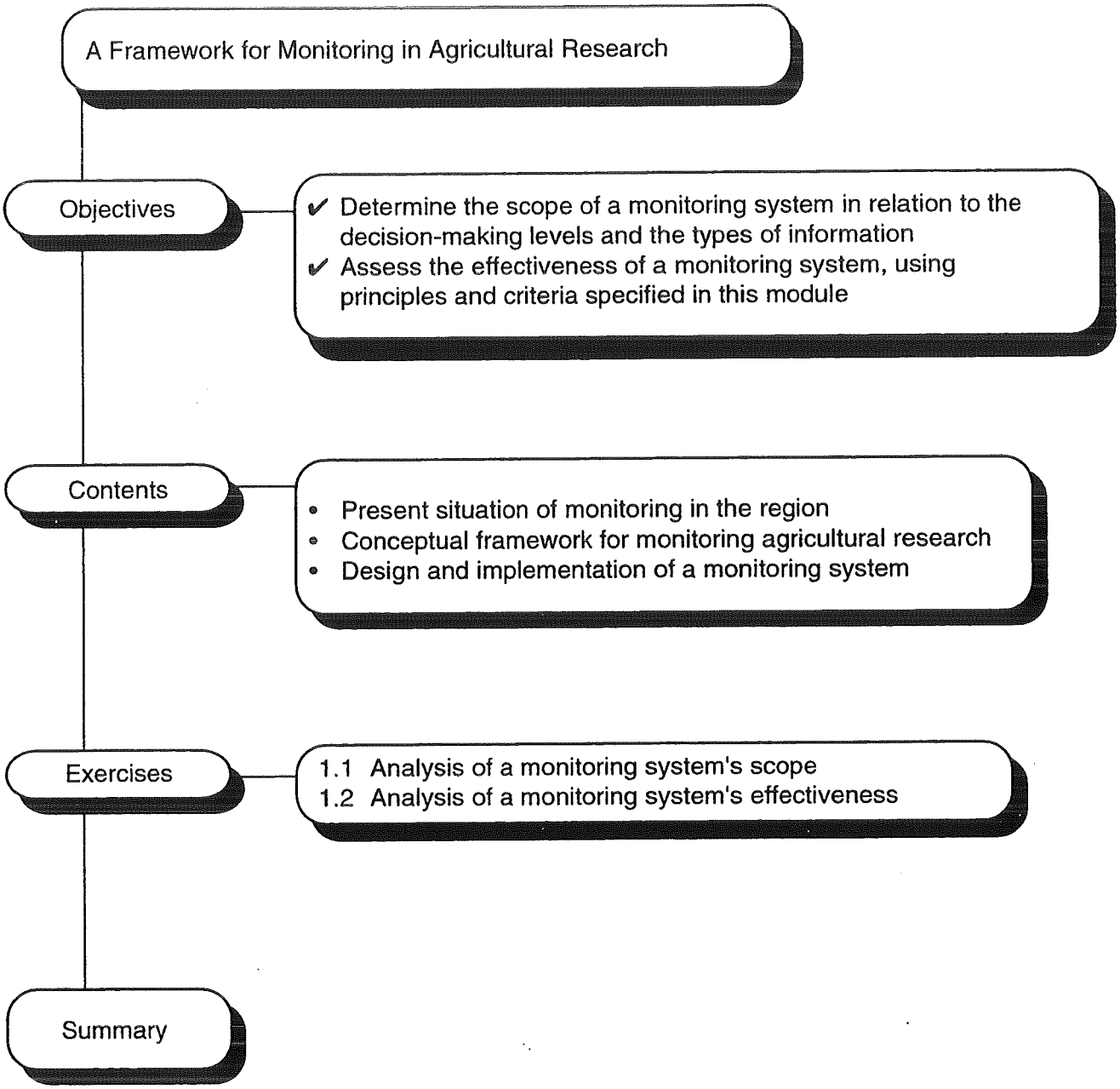
Sequence 3 makes an in-depth analysis of three of the main monitoring instruments: internal reviews, progress reports and project databases. The first two are used frequently in monitoring programs, projects, and activities, in order to provide information at the different management levels. Even though project databases are relatively new instruments in monitoring, several institutions want to incorporate them in their organization.

The module ends with an exercise for participants on the preparation of proposals for strengthening the monitoring system.

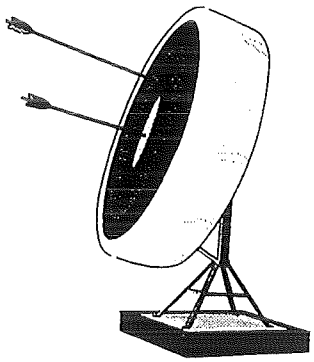
Sequence 1. A Framework for Monitoring in Agricultural Research

Page

Flowchart for Sequence 1



Objectives of Sequence 1



Upon finishing this sequence, participants will be able to:

- ✔ Determine the scope of a monitoring system, in relation to the decision-making levels and the type of information to be obtained.
- ✔ Assess the effectiveness of a monitoring system, using principles and criteria specified in this module.

Introduction

Monitoring is a continuous process involving observation, supervision, revision, and the documentation of agricultural research activities in relation to needs, objectives, expected results, and the resources allocated for its execution. Formal or informal instruments can be used for monitoring. A good monitoring system is essential for the efficient management of agricultural research.

Monitoring activities are common among the agricultural research organizations in the region; frequently, these take a great deal of time from both scientists and managers. However, in many cases, monitoring is not conducted in an organized and systematic way. Therefore, improvements in the monitoring process can significantly increase its support for decision making as regards on-going work, periodical evaluations, planning future research, and motivating and guiding scientists (see inset with examples of improvements in monitoring processes in the region).

This sequence presents a summary of monitoring experiences in the region and provides concepts and guidelines for systematizing the monitoring process within agricultural research organizations. The application of these concepts and guidelines may increase the efficiency of monitoring results.

The first section describes the status of monitoring in the region, based on 13 case studies conducted in 1992 (Novoa and Horton, 1994). The second section presents several key monitoring concepts and includes criteria for analyzing a monitoring system. The third section identifies the main components of a monitoring system and presents options for organizing the system, and for collecting and managing information. The final section offers criteria for analyzing the effectiveness of a monitoring system. The main criterion identified is the usefulness of the information collected, generated, and processed, in terms of its effective support in decision-making, in documenting research, and in motivating and guiding researchers.

Examples of monitoring in the region

Before its reorganization, the **National Institute for Agricultural Technology (INTA), in Argentina**, had a very centralized structure and all new proposals and progress reports were sent to headquarters to be revised and approved. The revision process was very slow and researchers received no reaction or response for several months (or in some cases never!). Due to delays and lack of feedback, monitoring became a bureaucratic and inoperative process. After its reorganization during the decade of the 80s and the decentralization in decision making, INTA has implemented new and more efficient monitoring mechanisms (such as revising proposal and internal reviews at the level of the research center) (Hogg, 1994).

The **Brazilian Enterprise for Agricultural Research (EMBRAPA)**, operated an information system which included data on research proposals, progress reports, and the final evaluations of all projects carried out in the last 10 years. This was considered an important resource for future evaluations. However, when the information system was to be used for evaluating projects already conducted, it was impossible because the system was specially designed to generate progress reports for external programs, and the computer software used did not allow for any other type of information analyses. After this, a new information system was designed in 1991, with sufficient flexibility to satisfy different internal and external needs (Borges and Horton, 1993).

The recently created **National Institute for Agricultural Research (INIA), in Uruguay**, considers clear definition of research projects and programs as one of its priorities. To facilitate this process, as well as research management and the preparation of reports, INIA is establishing a computerized information system (personal communication).

Present Situation of Monitoring in the Region[1]

Research directors, specialists in organizational development, politicians and development planners have agreed on the importance of improving management and administration in general, and mechanisms for planning, monitoring, and evaluation in particular. During a 1992 workshop in Mexico, strengthening these functions was considered vital for institutional change and modernization, and to guarantee the effectiveness and impact of agricultural research and technology transfer.

PM&E methods and mechanisms designed and adopted in the future must be seen within the context of the region's agricultural sector, based on the patterns and tendencies of regional technological development and on institutional policies promoting these mechanisms. In fact, one of the main results of analyzing case studies and the discussions held at the meeting in Mexico, was the diversity of experiences highlighted in the institutions evaluated, the complexity of technical decisions and their relationship with all the resources allocated for carrying out decisions, the magnitude and type of services provided, the diversity of the clientele, and the heterogeneity of its actions (Novoa and Horton, 1994).

It is important to learn from these experiences. ICTA's practical and simple approaches in Guatemala, are focused on direct work with producers in their farms. Other larger institutions, which have greater experience in the use of formal PM&E models and methods, would like to incorporate these valuable aspects of farmer participation. The cases of the National Coffee Research Center (CENICAFE) in Colombia and of Argentina's INTA were outstanding in the way they tailored their activities to their audiences and were, therefore, able to meet the demands and expectations of specific clients.

The following are the main common characteristics of monitoring in agricultural research, which reflect the richness of the experiences analyzed.

[1] This Section is based on Novoa and Horton, 1994.

Underrated Function of Monitoring

The function of monitoring in agricultural research management has been underrated, both in essays and conceptual models on the subject, and in its applications. While planning and evaluation have been associated with conceptual models, monitoring has not. This function has been considered as part of the execution phase of plans and has often been seen as **control** or **on-going evaluation.**

Learning on the Job

A large number of people working on monitoring in Latin America and the Caribbean have acquired specialized skills through practice and learning by doing. Very few institutions in the region have technical teams with formal training in the general area of monitoring, and even fewer in the specific field of agricultural research monitoring.

Purposes of Monitoring

Monitoring has had two main purposes in the institutions studied: (a) to collect information that will enable on-going decision making regarding activities, projects, programs, and research centers, and (b) to document input use and activities carried out for accountability requirements. Monitoring activities are concentrated at the operational level of projects and programs. As an essentially internal activity, monitoring is used to check how activities are running, how resources are being used, and where intermediate goals are being fulfilled

In a few cases monitoring checks on overall institutional performance, which is generally considered as an aspect of evaluation.

The Agricultural Research Center of Washington State University and EMBRAPA have broader definitions. They identify the main purpose of monitoring as contributing to the execution of activities, projects, or programs, and establishing whether these are productive and meet institutional needs and set objectives. Thus understood, monitoring fulfills the function of **training and supporting** research and not just controlling and verifying its execution. The difference in monitoring in the specific, but complementary, dimensions of **institutional monitoring and research program and projects monitoring** is identified by EMBRAPA. This institution has also developed methods and instruments that are relevant to each one.

Monitoring Instruments

Practically all institutions monitor established plans and programs at some point during their execution. Most methods and instruments used for monitoring are informal and are only partially systematized. The more

broadly used instruments are field visits and reports prepared by researchers. Some organizations use data bases, periodical reports, and budget monitoring for project and programs. Experimental stations and regional research centers also use field visits, budget monitoring, and written reports. At the institutional level, the more widely used monitoring instruments are internal and external reviews, administrative meetings, and periodical reports, such as annual reports.

The monitoring instruments more widely used in Latin America and the Caribbean have been:

- *Field visits*
- *Progress reports*
- *Internal reviews*
- *External reviews*

Scientists, managers, and research project and program leaders usually participate in internal reviews. Specialists or technical groups invited from other institutions generally participate in external reviews. External reviews are primarily used for monitoring projects implemented with external funds, for the overall revision of research centers and organizations, and when institutions phase in restructuring processes and new scenarios for activities (such as changes in their mandate or budget).

Information for Monitoring

Monitoring activities frequently demand a considerable amount of time on the part of researchers and intermediate level management. Often, activities are not conducted regularly and those that are conducted, are considered "bureaucratic" because the information obtained is not reflected in decision making. Sometimes monitoring activities generate large volumes of information that exceed the institution's analysis capacity and are, therefore, never used. Recently, efforts have been made to design and put into practice specialized data bases (as is the case of INTA, in Argentina, and the Colombian Institute of Agriculture and Livestock in Colombia). However, these have not yet been completely systematized, and institutional mechanisms are lacking which could profit from their full potential.

Information generated from monitoring is generally found in restricted access and consultation media, such as internal reports, but not in journals, scientific articles and other publications.

Summary of Experiences

Some organizations in the region have highly-developed monitoring systems. Such is the case of INTA in Argentina, EMBRAPA in Brazil and the Caribbean Agricultural Research and Development Institute (CARDI). These organizations have elaborate systems for collecting information about on-going activities, specialized data bases, and computerized

information management systems. The remaining cases have weaknesses in their information systems which limit the monitoring role in decision making, in the execution levels of projects, programs, and research centers, and in the higher management organisms of their institutions, as in documenting research activities and results. This is explicitly recognized by most institutions, which are making an effort to improve their information systems.

An important difference was found in the case studies between monitoring systems in the United States and Canada and those in Latin America and the Caribbean. Institutions in the U.S. and in Canada—characterized as being very efficient—did not have highly developed systems or procedures for planning and evaluation, but did have well organized and systematized monitoring systems with a broad participation by producers.

Overall, monitoring is more organized and systematized in the case of projects financed by external agencies (national or international). Research financed with its own resources, or with the institution's core budget, normally does not monitor activities or results.

Another important pattern observed is that participation of producers in decision making within the organization requires good monitoring of activities and their results. Some examples are INTA (Argentina), CENICAFE (Colombia), Washington State (USA) and Lethbridge (Canada), where producers have representatives at the decision-making level, and frequently participate in internal and external reviews of activities and their results.

Conceptual Framework for Monitoring Agricultural Research

Monitoring Concepts [2]

Monitoring should be a part of an integral planning and evaluation system (PM&E). The process must be developed with the interaction among its components, and its methodological and operational articulation in mind. The design of instruments must be consistent with planning and evaluation processes. This the reason why sometimes it is not easy to distinguish monitoring from evaluation or from planning, since monitoring also provides information for evaluating results and makes recommendations for reassigning resources and redefining priorities.

Monitoring is a process of continuous observation, supervision, revision, and documentation of research activities in relation to its context, objectives, expected results, and resources allocated for its execution.

The main end of monitoring is supporting **decision making** concerning an institution's on-going activities, and advising scientists and administrators about problems and deviations from objectives and from expected results. Monitoring is necessary for quality control and also for identifying and taking advantage of opportunities not anticipated in the original research design.

[2] Suggestion for the instructor: To introduce this subject, a group dynamic is suggested. It would allow the development of the contents, based on participants' knowledge and experience. The audience can be divided into 5 groups. Each group must answer in 10 minutes one of the following 5 questions which synthesize the subject's content, and write the answer on a transparency:

1. What is monitoring?
2. Why is monitoring done (objectives)?
3. For whom?
4. What information is processed and recorded?
5. How does the information circulate?

Once the 10 minutes are over, the instructor invites the first group's speaker to share his answer with the whole group. The audience is invited to comment on the answer and suggest other ideas. Using the transparency, the instructor then completes the answer to the question and follows the same procedure with the remaining questions and answers. This will cover the main contents of this subject. To facilitate the instructor's task the 5 questions are found among the transparencies that accompany this module.

In addition to supporting decisionmaking concerning an institution's on-going activities, a monitoring system must provide a **record of information** on research objectives as related to needs, the methodologies and designs used, the resources used, the activities conducted, and the results achieved. This record should facilitate the preparation of reports for internal and external use. It should also contribute to an "institutional memory" of the organization, and thus supply information for evaluation and for planning future research.

A good monitoring system includes six essential components (Figure 2):

1. Collection of information.
2. Processing and analysis of information.
3. Information storage.
4. Production and distribution of reports.
5. Decision making based on information collected.
6. Actions.

The first four processes (information collection, processing and storage, and production of reports) are the typical components of an information system. Decision making and implementation of activities are beyond the domain of an information system, but are essential parts of a monitoring system and constitute its justification. Without decisions and activities based on the information generated, the monitoring system becomes a mechanical and bureaucratic exercise of little use in agricultural research management.

To design and implementation of these seven processes are dealt with in detail later in this document.

The concepts discussed to this point are necessary but are not sufficient to ensure an effective monitoring system or to contribute to institutional sustainability or to the quality and social relevance of the research being conducted. To achieve these ends, attitudes and intentions are required which conceive of monitoring as "an institutional process of permanent learning, and internal educational process involving all levels of the organization" (Ayres, 1993).

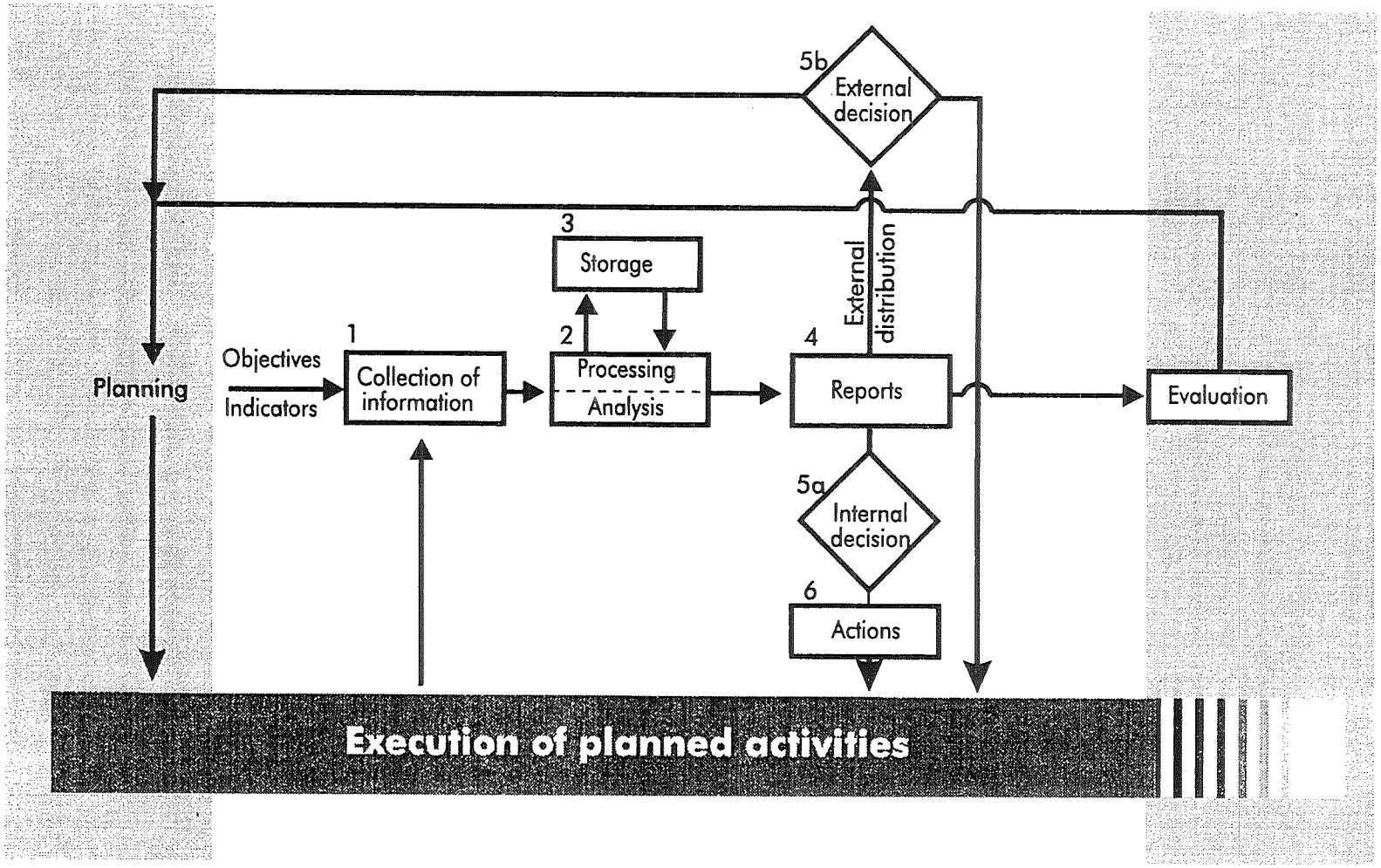


Figure 2. Components of a monitoring system and their relationship with planning and evaluation

Taking this into consideration, the following definition of monitoring which complements the one given at the beginning of this section:

Monitoring is a participative and decentralized analysis process of research advances in relation to its context, objectives, expected results and resources allocated, to foresee deviations, problems and opportunities. Monitoring should support researchers, administrators, managers, and directors, providing them with elements for making adequate decisions at each level of the organization.

All management levels should be involved in monitoring. As a mechanism, monitoring allows an institution to ensure the fulfillment of plans and orients all its members towards common and shared objectives.

Uses of Monitoring

Monitoring has three main uses in agricultural research:

- Supporting decision making concerning on-going research, by **detecting problems and opportunities and by controlling quality.**
- Documentation of research and its results backs up the **preparation of reports,** and the **evaluation** and **planning** of future research.
- **Motivating and guiding** researchers by promoting self-management and contributions from supervisors and colleagues to progress reports. The credibility and motivational force generated by monitoring activities are influenced by the clearness and continuity of its processes, the genuine participation of beneficiaries, and the flexibility and agility required to acquire information from different sources and have it reach its destination on time to back up adequate decision making at the different levels of the organization (from the researcher to manager).

In designing and operating a monitoring system, these three uses must be kept in mind to avoid them from becoming bureaucratic, mechanical, and time consuming without contributing to good performance by researchers and research programs.

The following parts will analyze the use of a monitoring system.

Detection of problems and opportunities. No matter how good a plan is, it is impossible to anticipate or predict all events that can take place during its execution. Thus, the supervision of planned research activities is necessary for detecting and solving the problems that may arise. In some cases, a problem can be solved at the level of execution; for example, if

inputs for an experiment do not arrive on time for planting, this problem may be solved by a change in administrative procedures. In other cases, monitoring of problem can indicate that plans are not realistic and that adjustments are required; for example, if it is impossible to finance a project, cancelling it and reassigning human resources must be considered.

During the execution of activities it is not only problems that arise; unexpected opportunities can occur too. For example, during the process of on-farm selection of new potato varieties resistant to cold, clones were found which were preferred by producers for other reasons such as cooking quality. In this case, instead of discarding those clones (because they do not satisfy the criteria of the original experiment), another activity can be initiated to investigate producers' criteria in selecting new varieties.

A monitoring system must be **flexible and efficient** in detecting problems and opportunities. This means that it detects and processes different types of information, and addresses relevant information to scientists and administrators in an adequate format and at the right moment for decision making.

Experience indicates that monitoring is more efficient in identifying problems and opportunities when administrators and scientists interact directly at the site where work is being conducted (for example during a field visit).

Quality control. Monitoring is essential to insure good scientific quality control of research activities. Reviews, by peers, of research proposals, visits to experimental fields, and internal and external reviews of research projects and programs are useful mechanisms of quality control.

Preparation of reports. Many organizations which do not have an organized monitoring system, require much effort and time from scientists and administrators in preparing reports required by external agencies. On the other hand, organizations with a good monitoring system (with brief but well structured reports from researchers to project, program or research center leaders) can easily prepare reports on research activities and results.

Evaluations. One of the main problems in evaluating agricultural research is the lack of relevant and trustworhty information on research activities and its results. Therefore, the type of information that is to be needed in evaluations must be anticipated and collected as a routine part of the monitoring system.

Planning. It is not just evaluations, but also plans which are commonly made with a great lack of relevant and trustworthy information. For example, priorities are frequently set without information on the current use of resources. This wastes a researcher's time.

Good planning requires a good information base on the context of the research, its objectives, on-going activities, and the results achieved. A great part of this information must come from the monitoring system.

Motivation and guidelines. Monitoring is commonly interpreted as a bureaucratic endeavor to satisfy requirements such as preparing administrative reports. But it can also be an important source of motivation and guidelines for scientists. Experience shows that preparation of substantial (not administrative) reports along with interaction between researchers and users of research results are vital mechanisms for motivating and guiding researchers. Therefore, these practices are regularly used by modern private firms conducting applied research.

Users of Monitoring

A monitoring system is effective if it can generate useful information that contributes to the efficiency of research programs. Within an agricultural research organization, the users of the monitoring system are scientists and anyone who has responsibilities in the hierarchy of decision making. The monitoring system must generate information to support these groups in making technical and administrative decisions.

Users of monitoring
- *Researchers*
- *Program and project leaders*
- *Managers*
- *Funding agencies*

It must also generate useful information for external priority groups participating in the technology generation and transfer process. (Figure 3).

These groups may include agricultural and planning ministries, extension programs, producers, universities, non-governmental organizations, and donors.

Group requirements vary both in information content, and in the format in which the information is presented and in the frequency it needs to be delivered. Due to report production and distribution costs, priorities must be set in relation to the users and the type of reports.

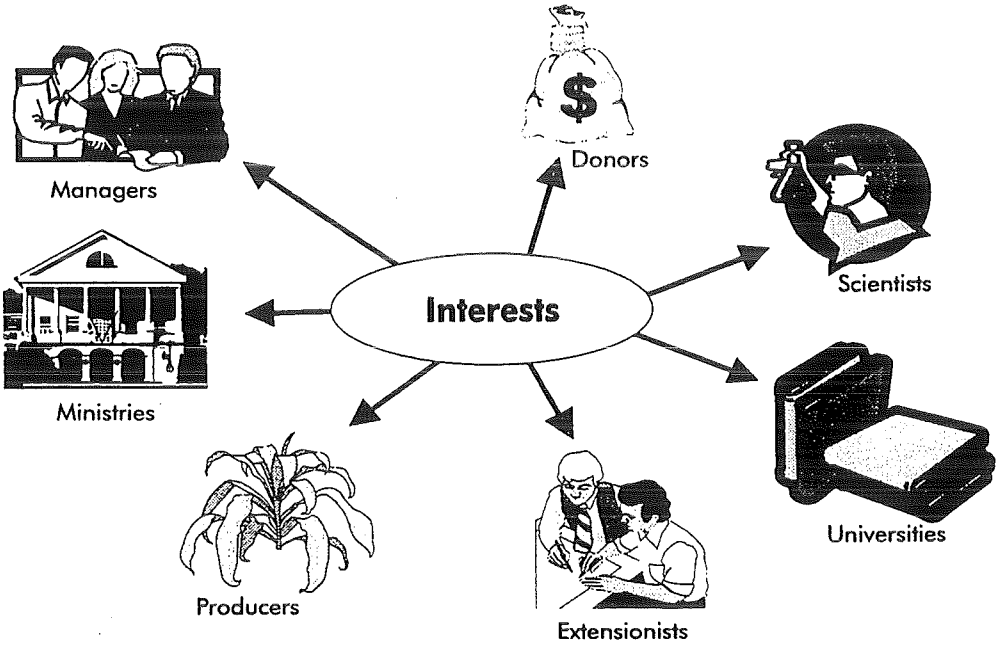


Figure 3. Groups interested in information generated by monitoring

Relation to Decision-Making Levels and Information Needs

Agricultural research institutions have a hierarchical structure with different **decision-making levels**. Monitoring in a research institution can, and must, have access to administrative and research processes. In the first case, emphasis is placed on aspects related to the logistics and supply of services. In the second case, emphasis is placed on the utilization of available resources. A visual example of this concept is the pyramid of programmatic research decision-making levels (Figure 4), which reflects the fact that more people and activities are involved in the lower than in the upper levels of the organization.

Monitoring must provide relevant information for decision making at all levels. The information required depends on the type of decisions made at each level. At the level of the researcher and program leader, detailed, technical information is required on objectives, aspects of activity design (i.e., experimental designs), task implementation, and results. This information is essential for planning, supervising, and evaluating the scientific quality of the work conducted.

The upper levels require more aggregate and synthesized information on research needs, program objectives and components, the allocation and use of resources, and the results and impact of the different research lines. This information is used for planning, supervision, and the evaluation of research institutions.

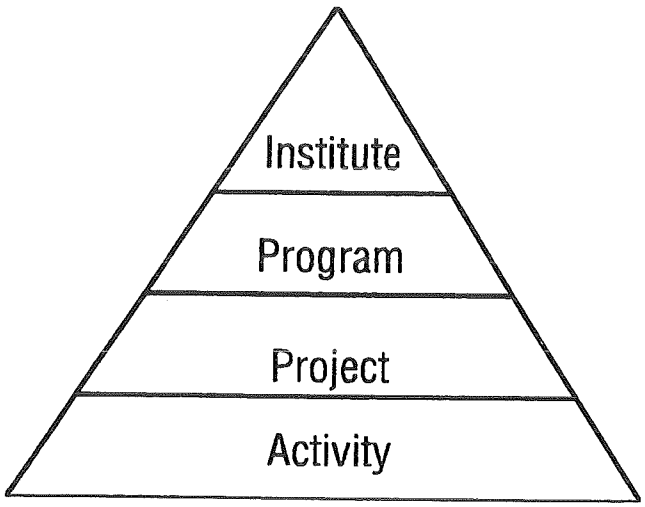


Figure 4. Examples of decision-making levels in an agricultural research organization.

Vertical Flow of Information

Several flows of information are required within a research organization. In the first place, "vertical" flow of information must take place between the different decision-making levels. Figure 5 shows vertical flow of information between different programmatic levels.

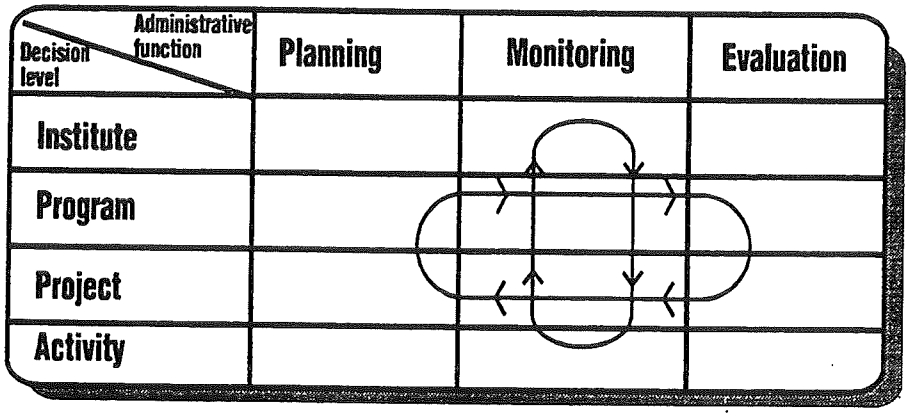


Figure 5. Examples of vertical and horizontal flow of information in a monitoring system

Managers need to communicate organizational and program objectives to researchers (top to bottom flow). Then, researchers need to communicate managers information on research proposals, on-going activities, and their results (bottom to top flow). Finally, managers must use the information provided by researchers to make decisions and must communicate these decisions to researchers (feedback).

If decisions are not based on the information delivered and if there is no feedback, researchers soon lose interest in providing information to the monitoring system.

Many organizations have more than one hierarchy of decision-making levels. For example, there may be an **administrative structure** with institutes, regional centers, and experimental stations, and a **programmatic structure** with the program and project levels. In these cases, the monitoring system must address the information required in such a way that it is delivered to each level involved (Figures 4 and 5).

The amount of information is not as important as its relevance and quality. In the fact, delivery of an excessive amount of low quality or irrelevant information for decisions may be highly counter-productive.

Many monitoring systems fail by delivering excessive amounts of semi-processed information to scientists or managers who do not have the time to analyze and interpret large amounts of information. They need synthesized summaries of situations, critical problems, and alternatives for action. Therefore, the requirements of different users must be analyzed, and concise and appropriate information delivered to each user.

Horizontal Flow of Information

The "horizontal" flow of information in monitoring, planning and evaluation is very important (Figure 5). Monitoring must start by planning because indicators are defined during this phase for monitoring the use of resources, progress of activities and results obtained. Plans must have appropriate objectives and indicators at each level of decision to serve as monitoring parameters during implementation.

Monitoring can be conceived as a phase of a continuous and iterative cycle in agricultural research management (Figure 6). Therefore, it must be closely linked to planning and evaluation at each different decision-making level.

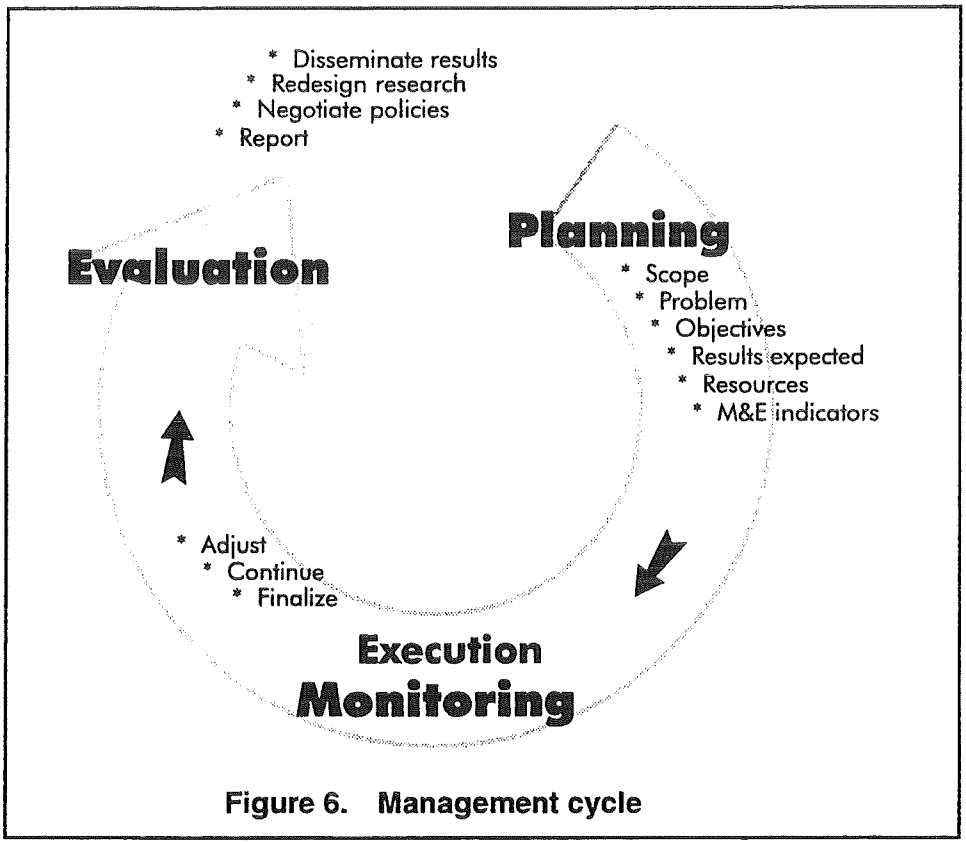


Figure 6. Management cycle

Information recorded in the monitoring system can also be used as the basis for subsequent evaluations. This requires that information requested by evaluators be anticipated. To anticipate the information required for evaluations, these should be designed during the planning phase to allow for information to be collected and processed during research implementation and supervision.

Types of Information

A **comprehensive** monitoring system contains information on four large groups of variables, in a format that is appropriate for making decisions at each decision-making level (Table 3):

- The research **context**, including needs
- **Inputs** for research, including objectives, plans, designs, resources, and foreseen activities
- Execution **processes**, including the use of resources and the activities carried out
- Research **products**, including results and impact on production, economy, social welfare, and environment

These common variables are used in decision making for agricultural research administration, especially in integrated PM&E processes.

Table 3. Examples of the four types of information in a comprehensive monitoring system

The research context
• Social, economic, political, technical, and environmental conditions.
• Producers and consumers needs.
• State of the art of knowledge in the scientific field.
• Priorities for research.
Inputs for research
• Objectives.
• Strategies.
• Plans and designs for studying.
• Sequence of activities to be conducted.
• Required budget and resources.
Research processes
• Activities conducted.
• Resources used (human, financial, physical).
• Administrative procedures used.
Research products
• Results obtained.
• Information and technologies generated.
• Resulting impact (economic, social, environmental).

Costs and Benefits of Monitoring

Collecting, processing, analyzing, storing, and disseminating information is expensive. Generating reports for all possible users on all possible variables would be so complicated and expensive that no agricultural research organization could afford it.

Due to costs, **priorities should be set for monitoring.** Resources available must be used in the most efficient way. Only relevant information should be recorded on the most important variables. Concise reports should be presented at the right moment for decision making.

A monitoring system must present scientists and administrators with the **minimum** amount of information required for them to be well informed and able to make sound decisions.

In terms of priorities, it is more feasible and less expensive to organize information on inputs and research processes. Finding and managing information on products is more complex and expensive.

Each organization has to evaluate its needs and possibilities and implement a monitoring system that is feasible and useful. A common strategy is to start by organizing information about on-going activities (information on Inputs and Processes) and—based on the experience acquired—broaden the system to include information on results (information on Products).

Design and Implementation of a Monitoring System

The design and implementation of a monitoring system should not follow fixed models; instead, it must adapt to the institution's conditions, objectives, resources and needs. Nonetheless, it is worth highlighting the fact that decentralized implementation of a monitoring system allows different actors to participate at different institutional levels, contributes the flexibility and agility required to be efficient, supports constant feedback, and increases the possibilities for clients and users to exert social control on the use of resources and on the results obtained.

Though planning, design, and coordination of monitoring may be centralized, implementation should be decentralized.

A decentralized system also brings about an increasing social acknowledgment of the institution and of the usefulness of researchers and managers.

This section analyses seven aspects in the design and implementation of a monitoring system:

- Prerequisites of an effective system
- Priorities for the system.
- System components.
- Instruments for monitoring.
- Organization of monitoring.
- System implementation.
- Indicators of monitoring effectiveness.

Prerequisites of an Effective System

Two conditions are required for a monitoring system to be efficient. First, top management must see the system as a priority tool for research administration and decision making. Without the commitment of managers, the system will not be allocated the resources and support required for efficient operation.

The second condition is a planning system that generates clear objectives and measurable indicators, to orient the collection and analysis of information during the monitoring process. Objectives and progress indicators are essential for conducting monitoring. (Strictly speaking, objectives and indicators need not be written, but writing them down has been found very useful in practice.)

Priorities for Monitoring

Monitoring a large number of variables is possible but expensive. Priorities should be established in the design of a monitoring system in terms of the type of information to be collected, processed and distributed. Priorities should be established based on different user demands, on costs, and on the feasibility of generating the information requested.

In establishing priorities for information to be collected, the following questions should be answered:

- **Why** is monitoring being conducted?
- **For whom** is monitoring being done?
- **What information is required**?
- **How should this information circulate**?

The person in charge of designing the monitoring system needs to get together with internal groups in the institution, and also with external groups related to agricultural research, to analyze their demands for monitoring information.

Based on this analysis, the institution's directors must determine priorities among the different types of information to be collected, processed and delivered to different users.

In addition to a list of priorities on the type of information to be delivered, the costs and feasibility of generating the information must be analyzed. Realistic priorities must be established; there is no use for example in trying to generate a series of reports on impact of technology disseminated among producers in the last 10 years if the institution does not have the resources needed to conduct such studies, or to contract them externally.

Components of the System

A monitoring system has six essential components (see again Figure 2):

1. Collection of information
2. Processing and analysis of information
3. Information storage
4. Production and distribution of reports
4. Decision making
5. Actions

In designing a monitoring system, the following five questions should be answered for each of the above components:

- Why is it done?
- What must be done?
- How should it be done?
- For whom is it done?
- Who must do it?

In designing a monitoring system, **the first thing to be done is to decide what reports will be produced and their distribution.** Then proceed with the other components.

Design of reports

As mentioned above, the preparation and distribution of reports must contribute to decision making, to documenting research, and to motivating and guiding scientists. In designing a monitoring system, the types of reports needed to contribute to the achievement of these three objectives must be specified.

The monitoring system must generate two types of reports: periodical and routine reports, and made reports specially requested.

The report contents and format must satisfy readers' interests as well as complying with their criteria and the feasibility of performing the different alternatives proposed.

As a general rule, administrative reports must be designed to satisfy the requirements of the different audiences (government offices and local, national and foreign donors). The design of administrative reports must consider their audience in order to identify common and specific requirements.

Agricultural research institutions have more flexibility regarding the design of their substantial research reports. In this case, the institution can establish its own norms in terms of frequency, content, style, and distribution of reports.

In terms of frequency in distributing information, four types of reports are important: one at the end of each agricultural cycle, one at the end of each experiment or project, one for each internal review, and one for each external review.

Fortunately, the report for the internal review cycle often coincides with that of the agricultural cycle and the same report can meet both needs. Also, the first three types of reports are the basis for preparing external review reports.

Reports must be designed as a function of readers' priority needs. Other scientists, program and research centers leaders, and extensionists are the main readers of reports at the project or experiment level. Therefore, these reports must include detailed information on research objectives, design, activities, and results.

Program, center, or institution reports need not include so many technical details but should rather emphasize the context and justification, for the research, the objectives, and the results expected and achieved.

Furthermore, program, center, or institution reports must provide a global view of research.

As an overall rule, **reports must be well-structured and have a clear and short format.** Currently, many reports are hardly any use because they are extremely long or poorly written; they include too many details and lack clear and relevant conclusions.

Collection of information

The information collection, processing, analysis, and storage systems can be designed once the design of reports is complete and the compatibility of reports that the monitoring system must generate and distribute has been assured.

Monitoring systems have a tendency to collect more information than will be needed or used. Therefore, it is important to emphasize that only information required to produce the reports designed should be collected. Monitoring systems can generally increase their efficiency by reducing the amount of information collected.

Once it has been decided what information is needed, different collection sources and methods must be considered. In many cases, information required for monitoring context and products is available from secondary sources or institutional documents. This eliminates the need for collecting primary information. Information already collected must be full taken advantage of to minimize the need for collecting primary information.

Information required for monitoring inputs and processes is produced in the development of agricultural research activities. If possible, this information should be collected, revised, and verified only once.

Before initiating information collection, care must be given to the importance of the information and to the feasibility of using it with the time and resources available. For example, researchers should not be requested to give information on their age, sex, education, specialization, and years of service in the organization if this information is available in the personnel files.

Information analysis and processing

The processing and analysis of information has several possible ends. An important one is **verifying the information collected**. This can be done by preparing lists and tables, summarizing information, confirming it with other sources, and asking original reporters to review the lists and tables used.

Another aim is to **facilitate storage in clear formats** (on paper or in electronic databases).

A third aim is **combining the information with information from several other sources** in order to make analyses. For example, information on experiments conducted during the current year can be put together with that of previous experiments. The results of a working cycle can be compared vis-a-vis initial objectives.

A fourth aim of processing is **conducting analyses** and converting data and information originally collected into more synthesized information to facilitate **arriving at conclusions** and making decisions. For example, information on the use of scientists' time and the use of other resources at the experimental stations can be aggregated at the national level to arrive at conclusions on the use of resources in the different research programs and regions in the country. This information may be valuable for establishing research priorities and evaluating results.

Finally, the fifth aim of information processing is **presenting results in different formats** such as summary tables and graphs. Modern computer software, calculation programs, and data bases help enormously in presenting information graphically to facilitate comprehension, scientific analysis, and administrative decision making.

Decisions on what information to process and how to process it must be made on the basis of reports required and on readers' needs. Information processing and analysis have the tendency to "over-process" information, thus loosing sight of the value of initial information and of users' priority needs. Therefore, the team responsible for information processing must contact final users (those that make decisions) frequently to receive orientation on priority needs.

Information storage

Part of the information generated by the monitoring system must be stored for future use. As in the case of other components of the monitoring system, **information storage must be tailored on the basis of future use.** A common mistake is storing too much information that can neither be found or used when needed. Therefore, information storage must have priorities and be organized on the basis of foreseen uses.

Generally scientists save information on their experiments and programs. **But what worries us are institutional files:** those that are kept at the level of agricultural research programs, centers, or institutions. Often these files are very inadequate and researchers lose valuable information on research conducted when they leave their institutions.

Since the central objective of an agricultural research institution is precisely to conduct research, **good scientific files must be kept.**

The three most important elements of a scientific file are: project proposals, progress reports, and final reports.

The profile must include concise information on research context (justification, previous work, needs) and on plans (objectives, materials and methods, experimental design, activities, required resources, expected results, and monitoring and evaluation parameters). Progress reports must specify activities and results for the period under analysis, in relation to objectives. Final reports must summarize all activities and results in relation to objectives and initial plans, and include an auto-evaluation of the experiment or project. Experimental data must be included in the final report to be useful to future researchers.

Two basic means can be used for filing: traditional files on paper and computerized data bases and spreadsheets. "Project databases" are becoming more popular every day for the computerized filing of research data. Computers offer important advantages for handling and storing information. However, many institutions have had serious problems with information management systems and with information transfer from one computing system to another. Therefore, keeping files on paper with the most important information on research (objectives, design, and outstanding results) is recommended during the implementation phase and while electronic files are being tried out.

Production and distribution of reports

Other reports may be prepared on the basis of project proposals and progress reports, as well as on the basis of reviews and field visits.

Scientists' project proposals and progress reports should be critically assessed and feedback provided. The program co-ordinator plays a key role in this process. The proposals, progress reports, and final reports, as well as those produced in internal meetings and field visits to an experimental station, can serve as the basis for elaborating the unit's annual report. The latter will be distributed and analyzed by the councils and users in the unit's mandate area and elevated to the regional level. The main activities, difficulties, breakthrough and achievements in the region will be synthesized at the regional level. Once approved by decision makers, these will have national scope for elaborating the institutional proceedings.

Having appropriate information at all levels of the organization will facilitate preparing reports according to demands and needs. Each report's contents must be adapted in terms of its principal audience.

Decision making

Eventually, the monitoring process must end up in decision making, either within or outside the institution. There are two major types of decisions: implementation decisions, related to conducting on-going research, and planning decisions, addressed at establishing priorities and designing future research.

Decisions must be implemented. Therefore, in making decisions, it is not only the things that need to be changed which must be specified, but also who is responsible for the actions required.

Actions

One of the main ends of a monitoring system is executing actions that improve research implementation. In fact, it is actions which respond to the information provided, which make the investment of time and other resources in the whole monitoring process worthwhile. If the people who provide the information for the monitoring system do not perceive its utilization and value, it is doubtful whether that they can continue to provide quality information to the system.

Monitoring Instruments

Information can be collected, processed, analyzed, and stored in many ways, and monitoring reports can be presented and distributed in many ways (Table 4). Some instruments used have very specific functions, for example, surveys for collection information and data bases for storing this information.

On the contrary, other instruments have multiple uses, for example, internal reviews are useful for collecting and analyzing information by the direct users themselves. This section will briefly address three monitoring instruments widely used in the region: internal reviews, progress reports, and management information systems.

Table 4. **Monitoring instruments and levels at which they are organized (Org) and implemented (Imp).**

Instruments	Institution		Center		Program		Project	
	Org	Imp	Org	Imp	Org	Imp	Org	Imp
Administration committee	X	X						
Annual programming meetings	X	X	X	X	X	X	X	X*
Internal reviews	X	X	X	X	X	X	X*	X
External reviews	X	X		X				X*
Technical seminars	X	X	X	X	X	X	X	X
Quarterly or bi-annual reports	X							X
Annual reports	X	X		X		X		X
Final reports	X							X
Project banksX	X		X		X		X	
Technical meetings of the Regional Council			X	X				
Field visits			X	X	X	X	X	X

* Generally, these revisions are organized at the project level when the projects concerned have external funding

Internal reviews

One of the main advantages of an internal review is the possibility of direct communication among participants coming from different units and decision-making levels of the organization. This "face-to-face" communication is usually more effective than written communication for identifying and solving problems; also it avoids the production and circulation of large amounts of paperwork. On the other hand, the disadvantage of an internal review is that it does not generate the systematic documentation of the activities and results produced by an organization, the problems encountered, and the recommendations made for future activities. For this reason, internal reviews should be combined with the preparation of progress reports on projects and programs. A report of presentations, discussions, conclusions, and recommendations made during the review as a whole should also be prepared.

Progress reports

Virtually all agricultural research organizations have to generate some kind of annual report on their activities and results. Inside the organization, scientists and heads of their projects, programs, and centers prepare progress reports on their activities. Similarly, many institutions do not prepare annual reports, or simply produce reports that are just a collection of progress reports of experiments and projects. The design of appropriate formats and training in technical writing are useful means for improving reports.

Management information systems

A management information system (MIS) provides research administrators with condensed or summarized information to support decision making. Each administrator has an information system, even though most of them are relatively informal. A MIS is designed and implemented with the purpose of providing relevant information to the administrator when he or she needs it for making decisions.

A very useful types of MIS in agricultural research is the **database project** which has information on approved research plans, resources allocated (or used), activities, and results.

Organization of Monitoring

A crucial aspect in the organization of monitoring is defining responsibilities. In terms of monitoring responsibilities there are several options; the one selected depends on each institution's conditions. The overall principle is that monitoring responsibilities must be associated with the persons responsible for decision making. Therefore, highly centralized institutions centralize monitoring responsibilities. In the same way, responsibilities need to be decentralized in decentralized institutions.

Monitoring is frequently believed to be the responsibility of a specialized unit, such as the Planning Department or the Monitoring and Evaluation Department. In large organizations, a department or a specialized unit can play an important role in designing procedures and in supervising monitoring processes. However, in general **it is not advisable that a specialized unit be directly in charge of implementing monitoring. Rather, the responsibility of implementing monitoring should be in the hands of those that make decisions**—those in charge of research projects, programs, centers and institutions.

Implementation of the System

Four general rules for implementing a monitoring system are:

- Start on a small scale, trying out and revising procedures.
- Implement procedures in a disciplined way.
- Generate useful information for different user groups.
- Revise the system periodically.

A monitoring system is very complex and it is impossible to predict its functionality before trying it out. Hence the importance of trying out the system on a small scale before generalizing its use throughout the institution. A useful strategy is to try the system at the research program or center level, revise it, and then implement it at the other centers.

Once the system is running, disciplined implementation is important. If scientists or administrators perceive that deadlines and other norms need not be met for the delivery of information, the system may quickly become outdated and be useless for making decisions.

The best way to insure institutionalization of a monitoring system is to deliver useful information to the different priority users, including the scientists themselves.

Once the system has been installed, it must be periodically reviewed (every three to five years) to evaluate its effectiveness and efficiency in relation to current circumstances, and to make necessary adjustments. On the other hand, it is not convenient to make continuous changes to procedures, since this would show signs of insecurity and disorder.

Monitoring Effectiveness

The effectiveness of a monitoring system is defined in terms of the degree to which it fulfills its objectives. Since objectives vary from institution to institution, specific effectiveness criteria may vary among monitoring systems. However, as a general rule, a monitoring system must meet the following three basic criteria:

- **Deliver useful information at the correct moment** to decision makers (internal and external).
- **Generate adequate documentation on research** (use of resources, activities, and results) that is useful for preparing several types of reports, planning future research, and making evaluations.
- **Motivate and guide scientists** toward the institution's priority objectives by means of feedback on decisions and actions taken.

Exercise 1.1 Analysis of the Scope of a Monitoring System

Instructor's Guidelines

Objective

✔ Analyze the monitoring system's scope in the institution where the participants come from.

Required resources

- Each participant has the information required for developing the exercise (information on scope of the monitoring system in his institution).
- Technical form specifying PM&E processes; decision-making levels, and variables in terms of the Context, Inputs, Processes, and Products model (CIPP).

Instructions

- Explain the objective, the exercise's dynamics for the work groups and for the plenary session, and the use of the technical form.
- Briefly describe the use to be made of the information which the participants have about their institution.
- Specify the time available for individual work (30 minutes), group work (40 minutes), and plenary session (10 minutes per group).
- Guide group presentations during the plenary session; orient discussions toward the subject of scope of the monitoring system (decision-making levels and types/variables of information).
- Make a final summary and analysis.

Time suggested for this exercise

Individual work	30 minutes
Group work	40 minutes
Presentation during the plenary session	10 minutes (per group)
Feedback	10 minutes
	90 minutes

Exercise 1.1 Analysis of the Scope of a Monitoring System

Participant's Guidelines

Individual work (30 minutes)

- With the use of the technical card, analyze information on the scope of your institution's monitoring system, or of the case given to you by the instructor. On the card, indicate whether the different types of information are available for each decision-making level. To indicate the existence of the information required, mark a cross (+) at the intersection of decision-making levels with the system's variables.
- Identify, by circling the cross ⊕ those scope areas that are stronger on information (i.e., context information at the program level). Comment about the type of instrument used and the circulation it has
- Explain the reasons for the absence of information on at least one decision-making level, and the implications of monitoring according to what you think.
- Among the empty cells or those with weak information, select those that should be improved, and propose a way should to fill this gap.

Group work (40 minutes)

- Share answers with the group.
- The group rapporteur, with the help of the other team members, will make a synthesis of the similarities and differences in information scope found by the group, and will present a synthesis of the reasons for the absence of information and proposals to cover important gaps.

Plenary

- The group rapporteur will make his presentation to the plenary group (10 minutes) and the instructor will present the final synthesis.
- During the plenary session, the instructor will summarize the exercise (10 minutes).

Exercise 1.1 Analysis of the Scope of a Monitoring System

Technical Form

The scope of a monitoring system is analyzed in terms of: (a) the information variables it includes and (b) the decision-making levels covered.

The work sheet illustrates the dimensions of a monitoring system. Decision-making levels are examples, since these vary among organizations.

Each cell refers to levels of monitoring activities in relation to each variable, in each component of the CIPP model.

Examples:

Monitoring exists:

- At the program level in relation to the strategies recommended during the planning process.
- At the project level on problems encountered during implementation.

Exercise 1.1 Analysis of the Scope of a Monitoring System

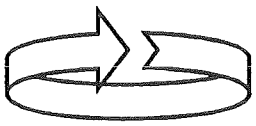
Work Sheet

CIPP Model Relevant variables		Decision-making levels		
		Institute	Program	Project
Context	Diagnosis of the situation Farmers' needs Other, specify			
Inputs	Plans, research design Indicators for M&E Budget Other, specify			
Processes	Activities conducted Resources used Problems found Other, specify			
Products	Information generated Technologies generated Impact Other, specify			

Exercise 1.1 Analysis of the Scope of a Monitoring System

Feedback

The following situation was found in a scope analysis of a case different from the one studied in this exercise:



CIPP Model Relevant variables		Decision-making levels		
		Institute	Program	Project
Context	Diagnosis of the situation		+	✔
	Farmers' needs			
	Other, specify			✔
Inputs	Plans, research designs			+
	Indicators for M&E			
	Budget			
	Other, specify			
Processes	Activities conducted		+	+
	Resources used		+	+
	Problems found			
	Other, specify		+	+
Products	Information generated		+	+
	Technologies generated		+	+
	Impact			
	Other, specify		+	+

Analysis

- The analysis shows a good degree of scope in: context, inputs, processes and products at the program and project level.
- At the program level, a diagnosis exists of the problems in each region and of the state of the art inside the institution.
- An annual operational plan also is available of the activities to be conducted by each program.
- A progress report for each program is produced each year.

Exercise 1.2 Analysis of the Effectiveness of a Monitoring System

Instructor's Guidelines

Objective

✔ Analyze the effectiveness of your institution's monitoring system and of other institutions in the region, according to the degree of usefulness of the system for different purposes.

Required resources

- The participant has the information required about the monitoring system in his institution.
- Technical form for analyzing the effectiveness of the monitoring system being studied.

Instructions

- During the plenary session, explain the objective, the exercise's dynamic, and the use of the technical form.
- Inform participants about the time available for individual work (20 minutes), group work (40 minutes), for the plenary session (10 minutes per group).
- Guide group presentations during the plenary session and orient discussion toward analyzing the effectiveness of the monitoring system.
- Make a final summary and analysis (10 minutes).

Time suggested for this exercise

Individual work	20 minutes	
Group work	40 minutes	
Plenary	10 minutes	(per group)
Feedback	10 minutes	
	120 minutes	

Exercise 1.2 Analysis of the Effectiveness of a Monitoring System

Participant's Guidelines

Individual work (20 minutes)

✔ On the basis of your institution's current situation, and using the enclosed table, evaluate from 0 - 3 the degree of effectiveness of the monitoring system, in relation to its purposes. For each purpose, justify your answer and indicate the most important monitoring instrument(s).

Group work (40 minutes)

- Share results, analyzing points of coincidence and divergence.
- Indicate, in order of importance, the three purposes best covered.
- Elaborate a proposal for changing the situation in relation to the three aspects least well covered.

Presentation at plenary

- A speaker from each group will present the analysis done, using the transparency prepared (10 minutes per group).
- All group members are allowed to participate in the discussion, to make the analysis clear and more profound.
- The instructor will summarize the exercise in the plenary session (10 minutes).

Exercise 1.2 Analysis of the Effectiveness of a Monitoring System

Technical Form

In principle, the effectiveness of a monitoring system must be analyzed in terms of the degree to which it achieves the system's objectives. Actually, organizations do not usually have explicit objectives for their monitoring system; in these cases, the system's effectiveness can be analyzed in two ways:

- In terms of the degree to which different users are satisfied with the system's information (based on interviews)
- In terms of the usefulness of the information provided by the system for different purposes

The following table can help in the first type of analysis: satisfaction with the information system.

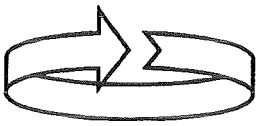
	Satisfaction with information from monitoring			
Groups of users	**0 Unsatisfied**	**1 Not very satisfied**	**2 Satisfied**	**3 Very satisfied**
Internal groups				
Scientists				
Project leaders				
Station heads				
Center directors				
Program directors				
Other....				
External users				
Producers associations				
Technology transfer programs				
Ministry of Agriculture				
Ministry of Planning				
External donors				
Other....				

The following table can help for the second type of analysis: usefulness of the information.

Purposes	Degree of usefulness				
	0 Bad	1 Poor	2 Good	3 Very Good	Justification/ observations
Detect and correct problems					
Detect new opportunities					
Control scientific quality					
Prepare administrative reports					
Prepare technical reports					
Support the planning process					
Support the evaluation process					
Keep a record of research					
Motivate and guide personnel					
Facilitate communication					
and articulation					
Other, specify					

Exercise 1.2 Analysis of the Effectiveness of a Monitoring System

Feedback



An effectiveness analysis of the monitoring system of CENICAFE, Colombia, has been conducted based on:

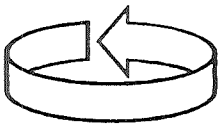
- The degree to which the different users are satisfied with the system's information (based on interviews)
- The usefulness of the information provided by the system for different purposes. This exercise will focus on this second type of analysis

Technical form 1 is used as an instrument of analysis.

The CENICAFE, Colombia, case is found in Posada (1994).

Exercise 1.2 Analysis of the Effectiveness of a Monitoring System

Feedback: Technical
Form 1 (case CENICAFE)



Monitoring activities or instruments / Different purposes	Internal reviews	Monitoring the Advisory Committee	Annual report from the project and program researcher	Institutional reports	Internal seminars	Periodical publications	Meetings with Technical Directors	Information system
Detection and correction of problems	2	2	1		2		2	1
Detection of new opportunities	2		1		2		2	
Scientific quality control	2	2	2		2		2	
Preparation of administrative reports				2				1
Preparation of technical reports			2		2			1
Support for planning	2	1		1			2	1
Support for evaluation	1			1	2			
Maintaining a file of research conducted			3					
Motivate personnel	2				3			
Information distribution	1		1	1	1	2	1	1

0: bad, 1:poor, 2:good, 3:very good.

Summary

Monitoring is a continuous process of observation, supervision, revision, and documentation of research activities in relation to their context, objectives, expected results, and resources budgeted for their execution. This sequence has presented an overall description of the status of monitoring in the region, a conceptual framework for monitoring agricultural research, and some points for designing and implementing a monitoring system.

The monitoring of agricultural research has not been given the theoretical attention received by planning and evaluation. However, monitoring activities in the region's agricultural research institutions are more common than planning and evaluation, and absorb an important portion of scientists' and research managers' time. But these activities are not conducted in a systematic way. Systematic monitoring of research in relation to its context, objectives, and resources allocated is not common.

The donors of agricultural research (both national and foreign) have established norms for monitoring the programs, projects and activities they finance, norms that have to be complied with by the agricultural research institutions. Basically, these are administrative norms dealing with the use of resources and the activities conducted. In contrast, there is a lesser degree of development of internal procedures for monitoring research programs, projects, and activities. Therefore, potential improvements can be made to the contribution of monitoring to sound decision making at the different programmatic levels of the organization.

A good monitoring system must make three contributions to agricultural research management: it must support decision making about on-going activities; it must be a source of documentation on research activities for preparing reports, evaluations, and planning; and it must motivate and guide scientists towards priority institutional objectives. A monitoring system includes six essential processes: information collection; information processing and analysis; information storage; production and distribution of reports; decision making; and corrective actions.

A monitoring system must operate as a component or subsystem within an integral PM&E system. The scope of the monitoring system is determined by the type of information it contains and by the decision-making levels it covers. A monitoring system has a broad scope when it contains—for each decision-making level—systematized information on: (a) research

context and users needs; (b) objectives, plans, designs, and expected results; (c) activities conducted and resources used; and (d) results and impact achieved.

No monitoring system covers all possible variables. Variables to be included have to be selected in designing the system, in terms of their usefulness (potential benefits), and the feasibility and costs involved in including them. Efforts should concentrate on aspects related to the research process.

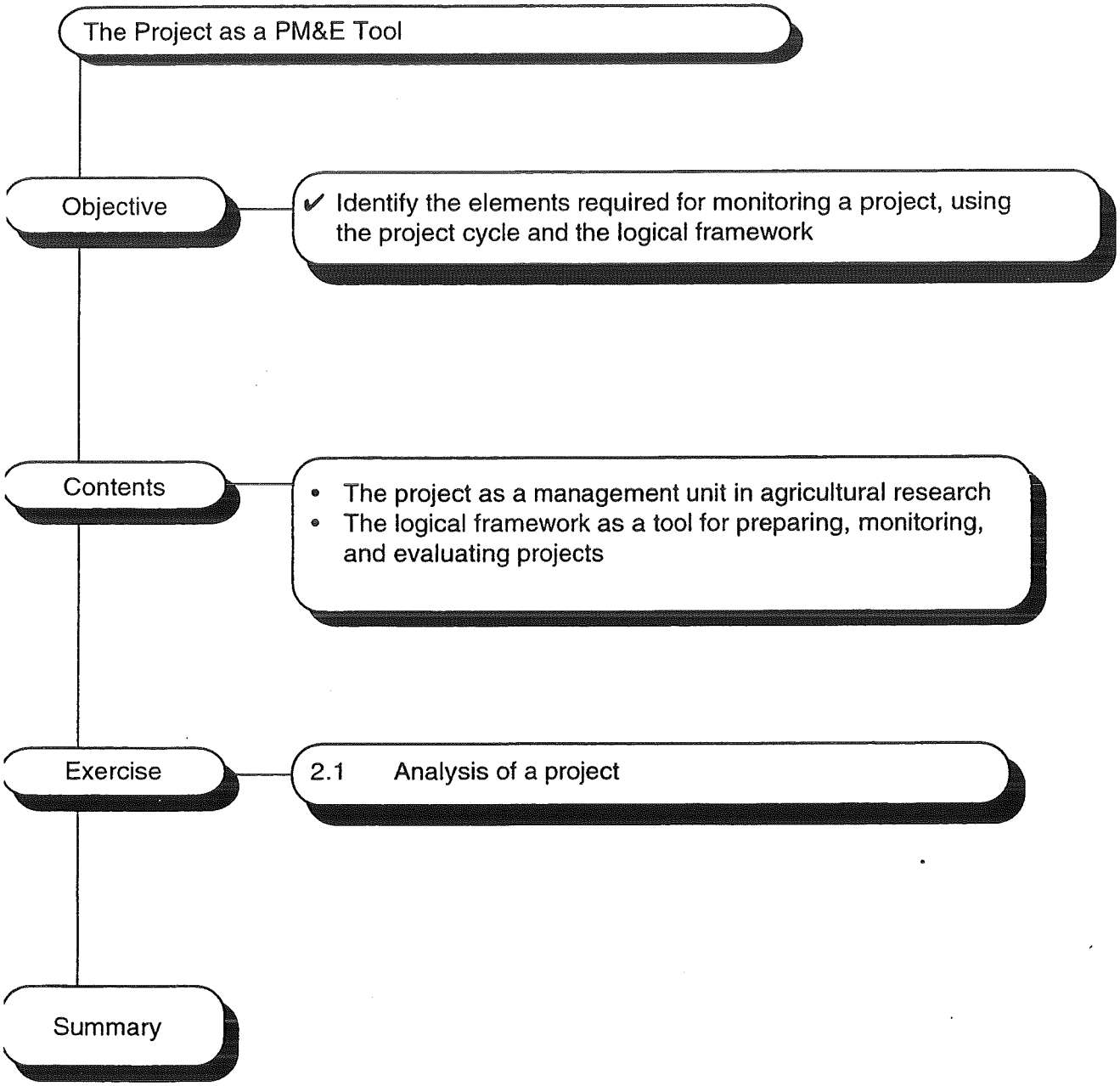
The following variables should be considered in the design and implementation of a monitoring system: prerequisites for the system's success, priorities for the system, the basic system components, instruments available for monitoring, organization of monitoring, and system implementation.

This sequence deals with each of these points and ends with a discussion of indicators of effectiveness in a monitoring system. A monitoring system's effectiveness can be measured in terms of three main variables: timely delivery of information, useful to those who have to make decisions about on-going activities; generation of adequate information on research which can be used to prepare reports, for planning, and for evaluations; and motivation and guidance for scientists towards the organization's priority objectives.

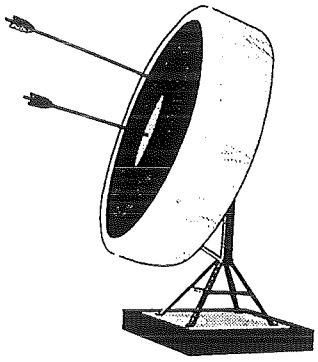
Sequence 2. The Project as a PM&E Tool

Page

Flowchart for Sequence 2



Objective of Sequence 2



After finishing studying this sequence, participants will be able to:

✔ Identify the elements required for monitoring a project, using the project cycle and the logical framework.

Introduction

The first sequence of this module studied the principles, scope, effectiveness, and organization of a monitoring system. This sequence will focus on the project as a unit of agricultural research management and particularly for monitoring. Nonetheless, the subjects covered in this sequence are applicable at the program, research center, or institutional level.

Research project management is an approach in which research activities are structured and managed in units called projects. The projects, in turn are managed as units of larger research efforts, called programs. Monitoring is used to keep activities and projects on track and ensure that they contribute to broader program and institutional objectives.

Projects can be managed following specific steps within the project cycle. These steps refer to planning, monitoring, and evaluation of agricultural research activities.

The first section presents the concepts of "project" and "project cycle" and identifies the main requirements for monitoring a project.

The second section presents the logical framework as a tool for preparing, monitoring, and evaluating projects. The advantages and inconveniences of using the logical framework are analyzed and suggestions are made for using the logical framework in agricultural research institutions.

The Project as a Management Unit in Agricultural Research

The Project Concept

A **project** is a set of interrelated activities, oriented toward solving a problem, with specific results expected at points in time, by applying certain resources, and methods. This definition suggests various project components that can be monitored:

- The solution of a problem
- Results obtained
- Deadlines
- Resources used
- Methods used

The project is the most common organizational and operational unit for managing international technical assistance. It is also frequently used in research management, by both the private and public sectors. The industrial sector has abundant experience in research and development project management. The application of project management is more recent in agricultural research (with the exception of projects financed by external agents).

Project management principles have recently been introduced to agricultural research, to improve its effectiveness and efficiency through planning, monitoring, and evaluation. Project management is particularly relevant when researchers compete for external resources and when research donors require clear information on research plans and results.

Historically, agricultural research has not been managed by projects. On the contrary, researchers have worked with relative autonomy and without a formal sense of planning and public responsibility. However, agricultural research donors have started to demand improvements in resource and program management. The introduction of project management concepts has been often a response to these external requirements. Thus, a large part of agricultural research in industrialized countries such as Australia, Canada, and the United States is managed through projects. Project management is also becoming common in Europe, Asia, Latin America, and the Caribbean. Likewise the use of participative methodologies at all stages of the project cycle is ever more frequent.

The Project Cycle

Project management follows a series of steps that constitute what is called the **project cycle**. Several organization have defined different cycles to meet their specific needs. But all variants of the project cycle include at least three general steps: preparation and planning, implementation, and evaluation.

A six-step cycle is suggested for agricultural research project management (Figure 7):

1. Identification of priority research areas.
2. Preparation of proposals.
3. Revision of proposals.
4. Approval of proposals and allocation of resources.
5. Implementation of research and monitoring.
6. Evaluation of results and impacts.

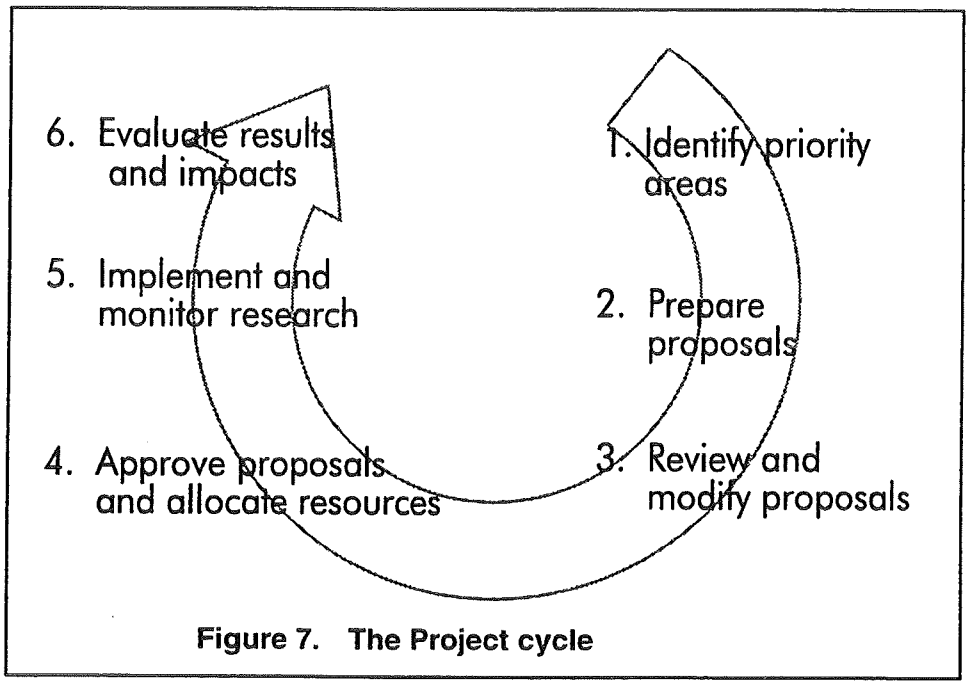


Figure 7. The Project cycle

Step 1. Identification of priority areas

Priority areas for research are identified within the framework of plans at the program and institution levels. A priority area must correspond to an important problem and pass the initial feasibility test: that research may generate a solution to a problem. Continuous institutional monitoring should be conducted in order to: (a) identify constant changes in priority areas, (b) confirm that on-going projects are relevant, and (c) guarantee a constant flow of resources by conceptualizing, formulating, and presenting new projects.

Step 2. Preparation of proposals

Preparation of research proposals is one of the most important steps in project management because implementation, monitoring, and evaluation are based, to a large extent, on the initial proposal. Several formats may be used for proposals; these generally include the following components:

- Title
- Summary
- Individuals and units in charge
- Objectives
- Expected outputs
- Justification and initial situation
- Previous research and status of current knowledge
- Strategies and methods
- Schedule of activities
- Resources required
- Methods and indicators for monitoring and evaluation

Step 3. Review and reformulation of proposals

Research proposals must be reviewed in terms of their relevance, feasibility, and scientific quality. Feasibility and scientific quality in agricultural research are usually reviewed by experts. In additions, it is important that producers or other users of research results review the relevance of proposals to assure that projects approved respond to actual needs.

Step 4. Approval of proposals and allocation of resources

While initial proposal review is the responsibility of experts, approval of proposals and allocation of resources is the responsibility of those who manage or direct the institution. Resources required for each proposal must be considered in project approval. It is better to implement a few, adequately-financed projects than disperse available resources among many, poorly-financed projects.

Monitoring of the four previous steps has become more important in later years due to an increasing tendency for research institutions to be financed through projects by external, national or international, donors.

Since proposal preparation implies the use of institutional resources, success indicators must be available for these steps. For example, the percentage of proposals approved by donors among those presented can be analyzed periodically. This percentage could be classified by variables such as: researcher, program, and type of donor.

If the percentage is very low, an internal cause must be identified; for example: deficiencies in identifying priority areas, preparing the proposal, and identifying possible donors.

The reason may also be found in external causes. The most important is the donor's lack of administrative flexibility to make decisions on time.

Regional agricultural research institutions, especially the larger ones, already have specialized offices to serve as liaison between donors and programs. An example the Colombian Agricultural Institute (ICA) in Colombia.

Step 5. Implementation and monitoring of research

This step starts once the project is approved and researchers have received the resources necessary, and continues until the project ends. This step includes daily research activities, and monitoring of activities and results.

The monitoring of a research project's implementation consists of the periodical review of activities, of the use of resources, and of results in relation to initial objectives and plans. Progress reports are useful mechanisms for internal project review. Some key questions for monitoring project implementation follow:

- Do objectives continue to be relevant and adequate?
- Have objectives been met?
- To date, what are the results of research?
- What have been the problems in implementing the project?
- Do experimental designs need to be changed?

Step 6. Evaluation of results and impact

Upon completion of a project, two types of evaluations can be made: a final evaluation and an impact evaluation. A final evaluation puts the emphasis on "extracting" knowledge to improve future research projects. This type of evaluation must analyze the following:

- Relevance of objectives
- Achievement of objectives (project effectiveness)
- Appropriateness of designs and methods (project efficiency)
- Products generated by the project (in relation to expectations)
- Contributions to overall knowledge
- Adoption and use of information and technologies generated
- Lessons from the project
- Recommendations for future research

An impact evaluation's objective is to determine the long-term impact of research on production, the economy, social welfare, and the environment.

Actually, few evaluations of finished projects are done in agricultural research. This is partially due to the lack of emphasis put on evaluations in general; another factor is that research activities tend to develop on their own and never end. An advantage of organizing research in projects and going through the steps in the project cycle is ensuring more discipline during planning, monitoring, and evaluating research activities.

Every one of the steps in the project cycle can be monitored. For example, monitoring of Step 1 (identification of priority areas) should focus on the compatibility of the problem identified with the objectives of the program, research center, or institution. The objective of monitoring Step 4 (proposal approval and allocation of resources) is determining budget availability.

An agricultural research project must be seen as a complex social phenomenon, having—from the moment that the first phase activities start until the last is completed—a strong interaction among actors involved. These actors may at times have conflicting interests (different strata of producers) or points of view (researchers and extensionists). This drives actors to try to allocate resources to where they can obtain more benefits (scientific, technological, social, economic, etc.). Negotiation of resources is done all the way from identification, planning, and implementation to evaluation, as expressed by Dusseldorp and Zijderveld (1990). An example can be found in the preparation of participatory research projects whose actors are producers, extensionists and researchers. From different perspectives, they are all seeking to find solutions to a production problem in a specific area. In such cases, formal and informal monitoring activities are more viable.

The Logical Framework as a Tool for Designing, Monitoring, and Evaluating Projects[1]

As previously indicated, preparing a research proposal is a central stage in the project cycle and is the basic requirement for subsequent monitoring. In many cases, projects show methodological deficiencies such as the following:

- The problem or the objectives are not clearly defined.
- There is no coherence between the problem and the objectives.
- The design and chronogram of planned activities is not consistent with resources available.

Therefore, the consistency of a project proposal must be analyzed, on the basis of the following requirements:

- The problem must be clearly formulated, justified, and within previously established priorities.
- The problem to be solved must be clearly related to the objectives.
- Objectives must be formulated coherently at all levels.
- The hypothesis that tries to answer the problem must be adequately formulated.
- Methods and techniques selected must be relevant for testing the hypothesis.
- Objectives, planned activities, and available resources must all be clearly related.
- All aspects indicated must be coherent.
- Achievement indicators must be clearly established.

Institutional difficulties are found in the project's preparation and implementation, for example, in the absence of a medium-term institutional program including a clear prioritization of objectives. This absence impedes the establishment of a relationship between objectives, programs, and projects. A second institutional difficulty is that the role, attributes, and responsibilities of the project's leader and participants are not clearly defined in the organizational structure. This makes identification of responsibilities difficult during key stages of the project.

A project should be part of a broader institutional program and address national and regional priorities and specific users' needs. In addition, the project should have a precise definition, or monitoring looses its sense and utility.

[1] This section is based on MSI, 1992.

In these circumstances monitoring is senseless and useless, because it is very difficult to have clear comparison parameters. When consensus is not reached on criteria to be used in monitoring, whoever establishes the criteria does it based on his own points of view, and these may not always coincide with those of the people executing the project. From that point on, conflicting attitudes arise toward the monitoring process.

What is the Logical Framework?

The "logical framework" is an instrument that can help solve several of these difficulties. Its main contributions are the overall logic it provides, the way in which it interrelates the main project components, and the relation it establishes among them and indicators which facilitate monitoring and evaluation. Each institution can decide in each case on its degree of applicability. The logical framework includes the structure of the main elements in a project, by establishing a clear relationship among:

- Initial problem.
- Expected results.
- Activities and resources required.
- External factors to the project which condition its fulfillment.
- Verifiable indicators of results and the place and procedure to find this information.

Use of the logical framework allows a quick way to interrelate these concepts and define indicators that guarantee project monitoring and evaluation. This summary is presented in a matrix having 4 rows and 4 columns.

Use of the Logical Framework

The logical framework can be used to:

- Define the project's initial situation precisely.
- Clarify objectives at different levels, and their interrelations.
- Give the project a framework within higher objectives.
- Quantify expected results, establishing success or failure parameters.
- Determine relationships between objectives and inputs (activities and resources) required to meet objectives.
- Identify external factors that condition the project's success.
- Identify information needs for monitoring and evaluation.
- Facilitate communication among the parties involved.
- Facilitate assignment of responsibilities to the project leader (or coordinator) and to participants.
- Serve as a guide for detailed preparation of the project.

The logical framework can be applied at any planning or decision-making level, from programs to experiments. If formulated at the program level or line of work, it facilitates formulating new plans. The logical framework articulates well with PM&E participative methodologies by orienting debate and consensus toward key decisions for a project. It is compatible with other techniques such as bar diagrams, flow diagrams, PERT networks, and cost-benefit analyses. Based on a cause analysis of current problems, the logical framework operates as an agglutinating factor in forming multi- or interdisciplinary teams.

The logical framework prepared for a project is not something definite or static; rather, it can be reformulated during any phase of the project cycle by quickly identifying the effects of modifications on other key project aspects. This implies a monitoring activity.

Some of the difficulties found in using the logical framework are:

- Includes identification of factors that escape the project's area of influence, but which are critical for the project's success
- Requires clear specification of activities and resources required for developing the whole project. This can make planning and execution relatively inflexible.
- Preparation is time consuming.
- If not cautiously introduced in an institution, it can overwhelm researchers who may think its preparation is excessively complex.
- Its formulation requires previous training and methodological support, at least during the first stages of elaboration at the institution.

Structure of a Logical Framework

A logical framework is made up of:

- The main elements of a project, expressed in terms of objectives at their different levels (outputs, purpose, and goal), and of inputs required to achieve them (activities and resources).
- The main assumptions of the project—factors external to the project that condition its success and are independent of its management. (Figure 8).

The logical framework enables preparation of well-structured research proposals that are more readily aproved, monitored, and evaluated.

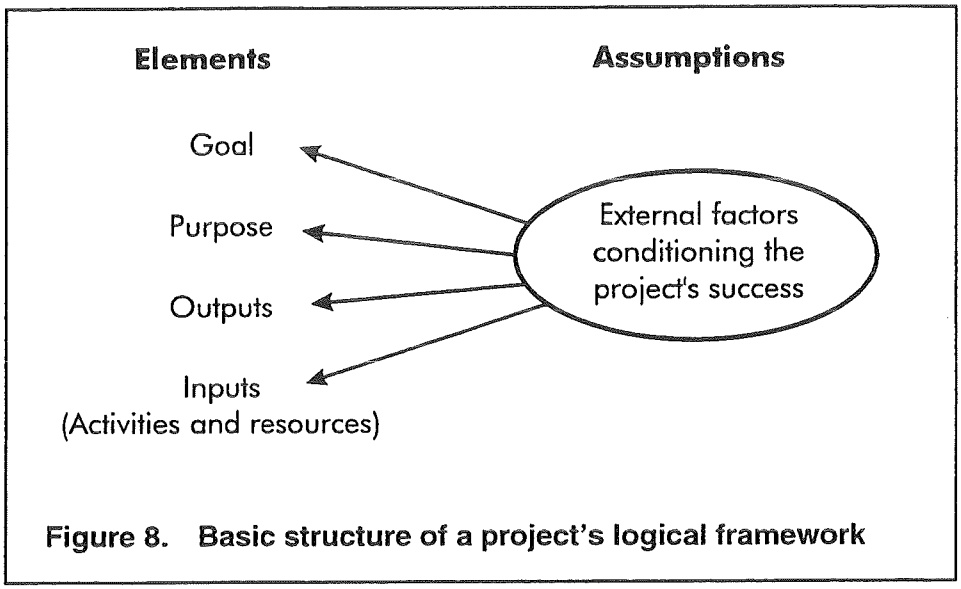


Figure 8. Basic structure of a project's logical framework

Goals

- The higher level objective to which the project contributes.
- The project is necessary but not sufficient to achieve the goal.
- It is a long-term objective. If must specify the target population.

Purpose

- The project's final objective.
- Marks the solution to the problem that originated the project.
- Defines the effect expected by the project and the target population.

Outputs

- The project's direct results.
- Achievements expected from the adequate management of inputs (activities and resources).
- Are made available to direct beneficiaries of the project.

Inputs

- The activities that must be developed and the human, economic, and physical resources required for executing the activities planned.

The concepts of goal, purpose, outputs, and inputs are illustrated with examples in Table 5.

Table 5. **Summary and example of the main elements of a project: Development of postharvest technology for tomatoes and peaches**

Concept	Example - Narrative summary
Goal • This is the ultimate objective of the program to which the project contributes • The project is a necessary but not sufficient condition to attain the goal • A set of projects shares a common goal	**Goal** Facilitate tomato and peach exports by sea
Purpose • Describe the impact expected of the project, and what it is expected to achieve if the project is thoroughly executed within the deadline • The project is a necessary and sometimes sufficient condition to attain the purpose	**Purpose** Develop technologies that maintain quality and extend shelf life of tomatoes and peaches
Outputs • Are achieved once the project is finished • Are the result of a project's activities and resource use • The project is a necessary and sufficient condition to achieve them	**Outputs** • 3 tomato cvs. and 3 peach cvs. having export quality and 30-day shelf life identified • Specific maturity indexes • Established atmosphere levels for 2 tomato and 2 peach cvs. • Susceptibility of 3 tomato and 3 peach cvs. to set quarantine treatments • Cost studies completed • Pre-freezing equipment developed
Inputs • Describe how the project is to be implemented, including personnel, and physical and financial resources • Arise from the operational task plan • Include activities and resources to put it in operation	**Inputs** • Peach and tomato plots • Cold storage rooms • Packing materials • Laboratory equipment • Work plans • Personnel from INTA and other institutions involved in the project • Bibliographic and information science materials • Activities with: adaptation of cultivars, harvesting date, pre-freezing effects, alternative treatments, costs, chemical inputs

Source: Furlani, 1993

Assumptions

Assumptions are factors (agronomic, socioeconomic, political, cultural) that can limit achievement of a project's objectives and that cannot be controlled by those in charge of the project. Several assumptions are found at each level of objectives. Each level of objectives is conditioned by external factors outside the project's control, but that are required to: provide an end goal, fulfill a purpose, obtain outputs, and conduct the activities. These external factors are called relevant assumptions. A project must solve a relevant problem within its broader scope objectives. This principle is illustrated in Figure 9.

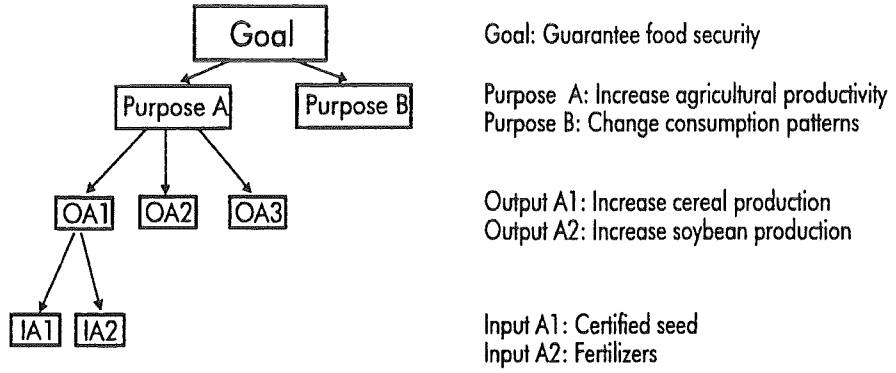


Figure 9. Illustration of relationships between inputs, outputs, purpose and goal

The higher the level of an objective, the less control one has over the assumptions. To a large extent, both activities and outputs are the direct results of a good management of the project's resources. In normal circumstances, they depend only slightly on factors external to the project and uncontrollable by those in charge of managing and executing the project.

On the contrary, the project goal depends on many external factors that cannot be controlled by those involved in the project. (Nevertheless, this does not mean that it is not necessary to show the contribution that achieving the purpose will have for reaching the goal, Table 6).

Table 6. Summary and example of a project's assumptions

Narrative summary	Assumptions	
	Concept	**Example**
Goal	• Conditions that affect the purpose-goal relationship. • Must take place in order to achieve the goal. • Slight control over them.	• Economic policies are maintained. • Technologies generated are compatible with production costs and are adopted.
Purpose	• Conditions that must be present to achieve purpose. • Slight control over them.	• The structures, human resources and priorities of the participating Units are maintained
Outputs	• Conditions necessary to produce the outputs.	• Favorable climatic conditions
Inputs	• Conditions required to carry out activities and make adequate use of resources.	• Timely availability of funds

Source: Furlani, 1993

The "Vertical Logic"

Three causal relations (hypothetical) exist from inputs to the ultimate goal (Figure 10):

- between inputs (resources and activities) and outputs
- between outputs and the purpose
- between the purpose and the goal

When a project's logical framework is designed, the inputs must be both necessary and sufficient to produce the outputs. Outputs, in turn must be necessary, but are sometimes insufficient to achieve the purpose. For example, in a national program, other complementary projects may be necessary to achieve the purpose of a project. The purpose is necessary, but never sufficient to achieve the goal.

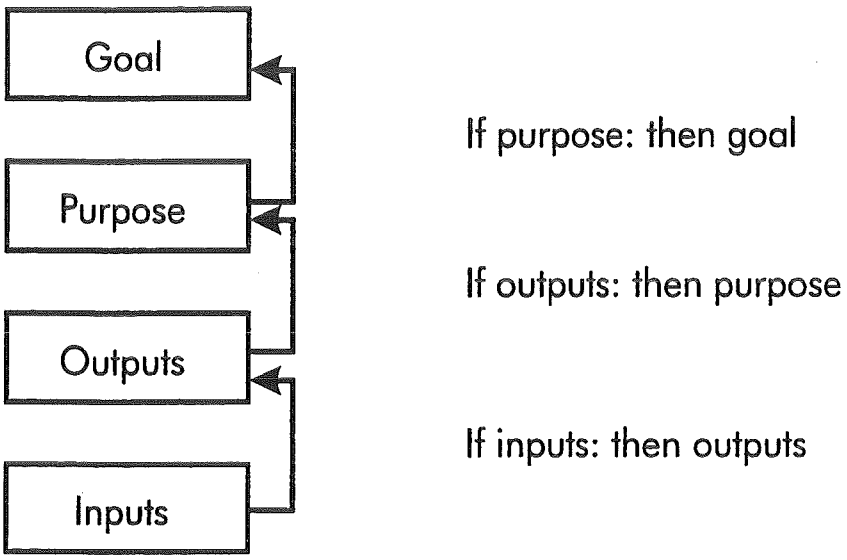


Figure 10. Relations among levels of objectives

The relevant assumptions (or necessary conditions) are added to these three causal relations to fulfill each level of objectives (Figure 11).

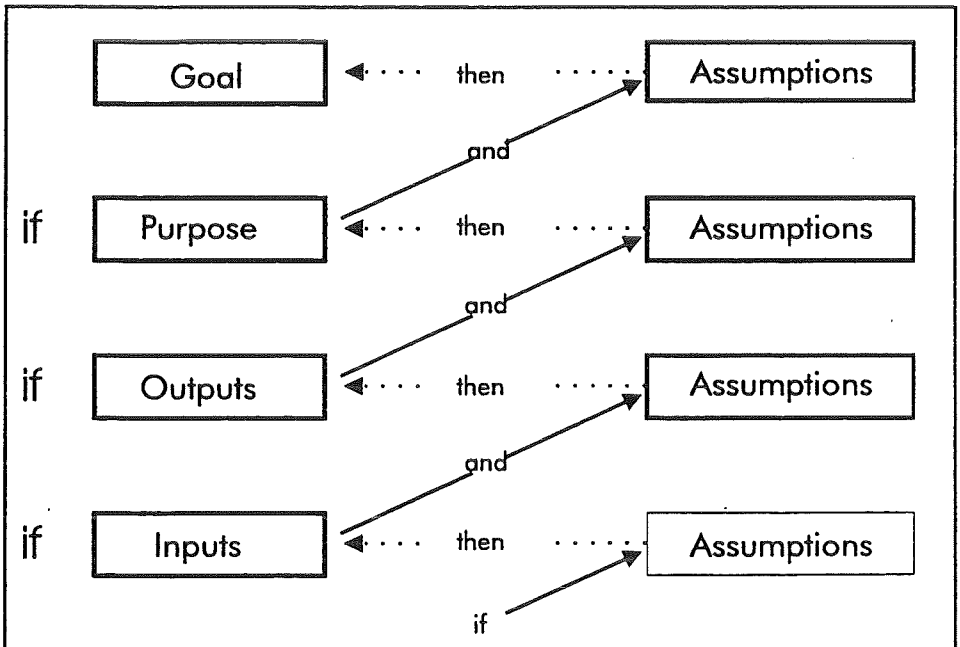


Figure 11. Relationships between objectives and assumptions

Example: Development of postharvest technology for tomatoes and peaches

Narrative summary		Relevant assumptions
Goal		
Facilitate export of tomatoes and peaches by sea	← then	- The economic model and economic stability are maintained
	and	- Technologies generated are compatible with production costs and it is feasible that they be commercially adopted
Purpose		
If Develop technologies that enable maintaining quality and extending shelf life of tomatoes and peaches	← then	Structures, human resources, and priorities of participating units are maintained
	and	
Outputs		
- Identification of 3 tomato cvs. and 3 peach cvs. having export quality and 30-day shelf life - Specific maturity indexes - Established atmosphere levels for 2 tomato and 2 peach cvs.	← then	Favorable climatic conditions
If - Susceptibility of 3 tomato and 3 peach cvs. to set quarantine treatments - Cost studies completed - Pre-freezing equipment developed	and	
Inputs		
- Peach and tomato plantations - Cold storage rooms - Packaging materials - Laboratory equipment	← then	Resources available according to budget
If - Work plans - Personnel from INTA and other institutions involved in the project - Bibliographic and information science materials		

Source: Furlani, 1993

The Initial Situation and the Intervention Strategy

A project can be seen as a proposal to solve a problem. Executing a project is setting a proposal to work until the problem has been solved and the initial situation has been modified or replaced by another. Thus, the starting point of a project is the initial situation which must be clearly defined and described.

Diagnosis of the situation must include:

- The problem(s) correctly identified.
- Relationships between problems and other incidental factors which should have already been revealed.
- Explanations of cause(s) of the problem(s).

Only then is it possible to imagine the intervention alternatives that, acting on one or more factors or incidental causes, tend to modify the situation in the desired way. Only after comparing the best alternatives it is possible to select the strategy that offers the problem's most advantageous solution.

In characterizing the initial situation, the problem must be:

- Qualitatively and quantitatively described
- Adequately circumscribed according to relevant criteria (geographic, economic, social, environmental, or technical-scientific)
- Clearly justified in terms of its relevance and demand to solve it

Given the importance of characterizing the initial situation, INTA in Argentina has incorporated it within the logical framework's structure in the column of assumptions at the level of inputs. Assumptions at the level of inputs are thus eliminated since the fact that the institution approves the project means that the factors that affect it at this level can be controlled.

Indicators and Means of Verification

Indicators and means of verification serve as the basis for monitoring and evaluating a project.

Indicators

Indicators are data or signs that allow the objective verification of an objective's fulfillment (be it a product, purpose, or goal) and of the inputs. They are direct or indirect measures of achievements. They make it possible to remember how achievements are measured at each level of the objectives. Therefore, they should be identified by a team and by consensus. As indicators show results, more than one may be needed to evaluate an objective's success. Since the purpose defines the project's expected achievements, indicators show "the project's final situation". In fact, the presence of indicators show the project's success and represent modification of the initial situation.

Indicators must meet various characteristics (MSI, 1992):

- Measure what is important in the objectives.
- Must be valid.
- Must be measurable.
- Must be independent.

Importance. Indicators must measure what is relevant in an objective. For example, in the formulation of the goal "increasing small farmers' income", it is easier to measure farmers' income. But the interest is in small farmers' income. Therefore, the indicator must reflect the interests of the small farmers and particularly, their income.

Validity. Indicators selected must be related closely enough with what needs to be measured, that one can be confident that the project was a decisive factor in obtaining the observable results. For example, saying that farmers profits are due to the establishment of a credit system is not enough. Other factors, such as a successful harvest, a high level of demand, or the scarcity of a specific product in the market, may have affected farmers' incomes. To demonstrate the role of the credit system, indicators must be found which link the credits systems to farmers, for example, the number of loans made to farmers and the incomes of these farmers.

Measurable. Indicators must be specified in terms of quantity, quality, and time (QQT). If one of these three factors is not present, failure or success cannot be measured objectively. A simple and progressive process allows specifying an indicator; this is described below, using an indicator of purpose achievement.

First step: **Identify the indicator**
Small farmers increase rice production.

Second step: **Quantify it**
30,000 small farmers (defined as those having 7 hectares or less) increase rice production by 50%.

Third step: **Define its quality**
30,000 small farmers (defined as those having 7 hectares or less) increase rice production by 50%, while maintaining the same quality of the 1992 harvest.

Fourth step: **Specify the time limit**
30,000 small farmers (defined as those having 7 hectares or less) increase rice production by 50% between October 1992 and October 1994 while maintaining the quality of the 1992 harvest.

Not all indicators can include these three characteristics. In the progressive process described, all steps have been included, but the resulting indicator is rather complex. The best indicator is a simple one. The quality aspect is very important, but many times ignored. In this example, the greatest concern is clear; if more rice is produced at the expense of quality, the project will have failed. In specifying, we must ask "how much is sufficient to achieve the objective? what should be its quality? and when is it needed?".

Independence. Indicators that show the achievement of an objective at a specific level cannot be used to demonstrate achievements in higher levels too. In spite of the fact that this is one of the simplest concepts of the logical framework methodology, it is also one of the most common errors. Another common error is that achievement of a result is commonly demonstrated by measuring the means used to achieve it.

For example, the development of a short-cycle onion variety (purpose) is not an indicator of increase in production (goal). In the latter case it could be: increase average yields from 400 to 800 kg/ha (100%) in the Cuyana region of Argentina, from 1990 to 1994, among vegetable producers having more than 5-hectare farms.

Special indicators. Good indicators are not always available. A good indicator is a direct measure of achievement; for example, increase in crop productivity can be measured by change in production, per hectare, in fields where the project operates, and evaluators can measure the project's success.

Frequently verification of the preferred indicators turns out to be very expensive. Such is the case when a survey has to be run among a large, dispersed, and heterogeneous target population. Then it is convenient to find indirect or approximate indicators or if these are not available, to change the means of verification (instead of using a survey with probabilistic sampling, use information provided by "key" informers).

Means of verification[2]

The next step in the application of the logical framework is to ask: How can indicators be measured? Indicators gauge the achievement of objectives. But if data cannot be found about the amount of rice harvested by farmers, then it is impossible to demonstrate that the harvest increased. Therefore, an increase in overall production cannot be shown. If success, or failure cannot be measured, the project's rationality must be questioned. Usually, the preferred indicator can be substituted by an

[2] This section is based on the MSI document, 1992.

alternative indicator that is closely correlated with the first one (for example, marketed rice). In many cases, appropriate data can be found using different means of verification. If farmers do not report their harvest, or do not have the means to weight their products, a survey can be made to count the number of sacks collected.

The value of an indicator is limited by the means available to verify it. In the previous example, another indicator must be found if a broad survey is required to obtain the data needed to verify the indicator and the project does not have funds to finance the survey. Verification of some indicators could simply require a quick revision of records from the project or from the government, while verification of other indicators require data collection and sophisticated analysis.

If verification of indicators is expensive and time-consuming, means of verification must be identified during the project's design stage. Therefore, project inputs must include human and financial resources required. If these are not planned at the beginning of the project, they may not be available when required. In the same way, sources of evidence must be identify for all important elements of an indicator. An example will make these concepts clear.

Example: Project: Reduced incidence of white mold in lima bean production in Tanzania

Purpose	Verifiable indicators	Means of verification
Reduce the incidence of white mold in lima bean production in sub-Saharan Africa.	Final situation: 70% increase in lima bean production in farmers' fields after the seventh year	• Farm surveys • Experimental project data

Source: adapted from Kamala, 1990.

In the example above, the indicator has two complementary means of verification. Means of verification must be carefully examined to assure that data is complete and trustworthy. Frequently, project leaders trust government records but later discover that these records are outdated or that data was informally collected and is therefore not reliable.

Table 7 summarizes some useful indicators for research program monitoring and their means of verification. Table 8 presents the complete matrix of the logical framework which we have been studying in this section. Table 9 is an example of the main concepts used.

Table 7. **Example of a research program's indicators**

Level of achievement	Possible indicators	Means of verification	Responsible for collecting data
Inputs - determined by projects, based on operational plans:			
• Personnel	Researchers' and assistants' time	Chronograms	Individual reports
• Funds	Expenses made	Accounting data,	Accounting office
• Infrastructure	Constructions or purchases	Work reports Data/supplies	Architecture/engin. office Accounting office
• Equipment and other goods	Acquisitions/utilization	Experiment station lab. reports Meeting proceedings	Accounting office Exp. station or lab. director
• Leadership	Meetings/projects Meetings/program	Individual reports Individual reports	Project leader Program coordinator
• Training	Complete courses	Reports/training	Training head
Outputs- considered by project and by program:			
• Preliminary research results	Protocols of experiments	Reports, publications, and revisions	Researchers Project leader
• Results of research already completed	Recommendations from the program committee	Program records Annual reports	Program coordinator Director of institution
• Improved research capacities	Trained personnel and better infrastructure	Records/training Management records	Head of training Director of institution
Purpose -contribution of program knowledge to research and development, and to decision makers:			
• New knowledge interest for research, extension, and decision makers	Proven technology and recommendations	Program record Certificates Communication about policies	Program coordinator Extension service Director of institution
Goal - relation of research with national development objectives:			
• Increased production	Data/production	Direct observation on used areas	Office of statistics
• More intensive land use	Changes in crop rotation and inputs	Statistics on inputs	Equitable distribution of income
• Soil conservation and use	Reduced erosion Resource planning	Rotation methods Planning document	Land use/distribution planning
• Greater income	Per capita income Greater consumption	Statistical data Rotation of area planted and regional rotation	Office of statistics Equitable distribution of income
• Improved nutrition	Reduced morbidity and mortality	Evidence of nutritional status	National health service

Source: McLean, 1989

Table 8. Matrix for the logical framework

Narrative summary	Verifiable indicators	Means of verification	Assumptions
Goal • This is the ultimate objective of the program to which the project contributes • The project is necessary but not sufficient to attain the goal • A set of projects share a common goal	Means or parameters that indicate that the goal has been achieved	Sources of information that allow verifying or measuring the indicators established (government statistics, reports, surveys)	• Conditions that affect the purpose-goal relationship • Must take place in order to achieve the goal • Slight control over them is possible
Purpose • Describe the impact expected of the project, what is expected to achieve if the project is thoroughly executed and within the deadline • The project is necessary and sometimes sufficient to attain the purpose	• Expected final situation of the project. • Final status of the project • Indicates the project is successful	Sources of information that allow verifying or measuring the indicators established (government statistics, reports, surveys)	• Conditions that must be present to achieve the purposes • Slight control over them is possible
Outputs • Are achieved once the project is finished • Are the result of a projects activities and resource use of the project • The project is necessary and sufficient to achieve them	• Magnitude of results	Sources of information that allow verifying or measuring the indicators established (government statistics, reports, surveys)	• Conditions that must be present to obtain the products
Inputs • Describe how the project is to be implemented, including personnel, and physical and financial resources • Arise from the operational task plan • Include activities and resources to put it in operation	• Type and cost of resources for each activity according to the chronogram • Project budget	Accounting and management reports	**Initial situation** • Characterization by analyzing the causes of the problem to be solved

Source: adapted from McLean, 1989

Table 9. Development of postharvest technology for tomatoes and peaches

Narrative summary	Verifiable indicators	Means of verification	Relevant assumptions
Goal Facilitate tomato and peach exports by sea	Volume of tomatoes and peaches exported	• Custom's export records • Officials statistics • FAO statistics	• The economic model and economic stability are maintained • Technologies generated are compatible with production costs and it is feasible that they be commercially adopted
Purpose Develop technologies that enable maintaining quality and extending shelf life of tomatoes and peaches	**Final situation** (at end of 5th year) Definition of postharvest technologies that allow more than 30-days of shelf life for 3 tomato and 3 peach cultivars	• Final report • Publications	• The structures, human resources and priorities of the participating Units are maintained
Outputs • Identification of 3 tomato cvs. and 3 peach cvs. having export quality and 30-day shelf life • Specific maturity indexes • Established atmosphere levels for 2 tomato and 2 peach cvs. • Susceptibility of 3 tomato and 3 peach cvs. to set quarantine treatments • Cost studies completed • Pre-freezing equipment developed	• Table of harvesting indexes and physical and chemical factors • Tables with O_2 and CO_2 values • Tables on white mold damage • Cost record sheets • Tables on heat transfer and freezing efficiency	• Partial reports of the project • Annual report of work plans • Publications	• Favorable climatic conditions

Table 9 Continued

Narrative summary	Verifiable indicators	Means of verification	Relevant assumptions
Inputs • Peach and tomato plantations • Cold storage rooms • Packaging materials • Laboratory equipment • Work plans • Personnel from INTA and other institutions involved • Bibliographic and information science materials	• Budgeted expenditures • Chronogram of activities • Percentage of time that participants have dedicated to the project	• Accounting records of participating Units • Partial reports on activities carried out • Personnel records	**Initial situation** • Minimum or nil peach and tomato exports • Off-season international demand for fruits and vegetables • Need for very high-quality products • Air freight is 2 to 3 times more expensive than sea freight • Lack of ample information about peaches, and no information available on tomatoes (quality, favorable harvesting date, and marketing periods of cvs. having export quality)

Source: Furlani, 1993

The "Horizontal Logic"

As shown in the previous examples, columns are interwoven for achievement indicators and means of verification , between the column of objectives and that of assumptions. This generates a horizontal logic. For the analysis of each objective, at the different levels, the best indicator and the most appropriate means of verification must be selected.

How to Formulate a Logical Framework

It is important to remember that the logical framework is a structured summary of: the main elements of a project, the assumptions on external factors that condition it, the indicators of project achievements, and the means of verification.

The "vertical logic" relates objectives to assumptions.

The "horizontal logic" relates objectives to indicators and verification means

The logical framework must be formulated together with the project's proposal. This task must be done in groups or teams, using participatory techniques. Team participants will vary depending on the type of project (research or extension), the subject, complexity, and geographical scope covered by the project. The group should include: groups affected by the project, institutions that may become involved, and specialists from several disciplines. INTA's Guide (1992) for project preparation, monitoring and evaluation, describes the methodology used by this institution for formulating projects using the logical framework.

Participatory methods are recommended, such as project planning by objectives (ZOPP), adapted to different circumstances (Saravia, s.f.). The steps to follow are:

1. Characterize the initial situation.
2. Formulate objectives.
3. Identify relevant assumptions.
4. Verify the vertical logic.
5. Select indicators.
6. Specify means of verification.
7. Verify the horizontal logic.
8. Review the complete logframe.

Step 1. Characterize the initial situation

A problem is an existing, underisable situation, not the absence of a solution. At this stage, the following should be done:

- Identify existing problems in relation to the underlying causes.
- Show the cause-effect relations of the problems, distinguishing the central problem, its more relevant causes, and its most important effects.
- Give an explanation of the problem's causes or diagnosis

Based on the problem diagnosis, imagine solution alternatives that act on one or various of the factors that cause the central problem. These should be compared, in order to select the one that offers the most advantageous solution and which is also feasible.

Remember:

- The problem should be set within specific boundaries (from the geographical, economic, environmental, or technical-scientific point of view)
- Its causes should be made clear
- Its relevance should be justified
- Intervention strategies should be analyzed, and the most advantageous selected
- To carry out this process, participative methods should be used

Step 2. Formulate the objectives

Objectives should be formulated on the basis of the problem diagnosis, the intervention strategy selected, and the higher level objectives (for example, social development, or medium- or long-term institutional objectives).

The project objectives are formulated for the different levels. This can be done by going from the general to the specific objectives, and then analyzing their consistency, ascending from the level of inputs.

Then the following are specified:

- **Goal**
- **Purpose**(s) (reverse the problem or initial situation)
- **Outputs**
- **Inputs** (activities and resources)

Inputs. Resources and activities internal to the project. Careful estimation of all inputs is essential for preparation of the budget and workplan. In general, inputs should be carefully estimated in full detail for the first year; for subsequent years they can be grouped. Each year, when annual approval is required, these inputs must be updated.

Outputs are the results of project actions or activities; they differ from inputs in that they are delivered, or made available to end users or direct project beneficiaries.

Inputs and outputs are closely interrelated. Each input leads to one or more outputs, in the same way that an output is not possible without applying one or more inputs. This relationship must be made evident in the description of these two levels of objectives.

Step 3. Identify the relevant assumptions

The incidence of factors of any kind (agronomic, social, legal, political, psychological, etc.) that cannot be controlled by the project is increasingly intense as the level of objectives ascends. Generally, at the level of the goal, external factors have a considerably stronger impact than the project itself.

Impossibility of exerting control over these factors does not imply they should be left unattended by the project. On the contrary, they must be carefully watched in order to prevent or counteract any unfavorable influence they may exert. The way to keep an eye out for them is to formulate relevant hypotheses, also called basic or relevant assumptions, concerning the behavior of these factors. Any variation in the expected behavior is a warning sign and may require modifying the project's action program.

Each level of objectives must be accompanied by the relevant assumptions, which will be more detailed and complete for the purpose and goal levels. At these latter levels, assumptions have their maximum importance. At any level, assumptions must refer to external factors with relevant incidence (actual or possible, immediate or mediate) over the project's results. The behavior of these assumptions should be specified under normal expected conditions. It is senseless to formulate assumptions for anomalous circumstances or improbable happenings.

Scaled objectives and corresponding assumptions form the logical framework of the project, which must be clearly set out during project design.

Step 4. Verify the vertical logic and make necessary adjustments

After characterizing the initial situation, formulating project objectives and spelling out the relevant assumptions, it is important to write the results of these three steps in a logframe matrix, to review them, to ensure their clarity and coherence, and to make any needed adjustments.

Step 5. Select indicators for each objective

- Identify it.
- Specify the target population.
- Determine the amount.
- Define the quality.
- Locate it in time.
- Locate it in space.
- Combine all these elements in one phrase.
- Verify whether the indicators selected are sound, and whether others with greater advantages have been left out.

Step 6. Specify means of verification for the indicators (MOV)

Contrary to indicators which cannot be related to two different objectives (this would indicate a mistake), the same MOV can be used for different indicators. In fact, more than one mean can be used for the same indicator.

If selected MOV imply a significative additional cost, it must be calculated and forecast in the budget.

To evaluate means of verification selected, ask the following questions:

- Does the source of information exist?
- Is it updated and trustworthy?
- In the case of collecting primary data, is there an adequate cost-benefit relation?

Step 7. Verify the horizontal logic

After steps 5 and 6, the selected indicators and means of verification should be summarized in the logframe matrix and the "horizontal logic" — the relationship between the objectives, indicators and means of verification— should be checked, and necessary adjustments made.

Step 8. Review the entire logframe

By this time, the entire logframe matrix should be filled out. The final step is to review the entire logframe for gaps in logic, clarity or adequacy of information. Here it is important to "step back" and try to view the completed logframe as an outsider would review it, and to make any needed changes to ensure that its logical, complete and easily understood.

Introducing the Logical Framework in Agricultural Research Institutions

Several institutions use the logical framework in planning, monitoring, and evaluating agricultural research (Horton *et al.*, 1993):

- The National Bolivian Potato Program has used it for planning and review of its activities. The Bolivian Institute of Agricultural Technology has applied it in planning other research programs.
- The National Institute for Agricultural Technology in Argentina uses the logical framework for project planning, monitoring, and evaluation.
- Recently the logframe has been used for planning a research system in Ghana; manager and researchers were brought together to discuss the objectives of the plan, indicators, and means of verification.
- It is also used for planning and evaluating the SADC/ISNAR (South African Development Community/International Service for National Agricultural Research) training project in Agricultural Research Management in Africa.
- Most international agencies use it to formulate and manage their projects, including those in agricultural research.

A new management instrument, like as the logical framework, is not easily introduced in agricultural research institutions. A strategy to introduce the logframe must consider the following points:

- Make logical framework procedures and formats compatible with existing ones for preparing of projects and reports, budgeting, and personnel management.
- Training seminars and workshops on the logical framework and on the preparation and management of projects.
- Use of the logical framework should start out with a few pilot experiences in each region and address one national program. As to advantages become obvious, other persons will be more favorably inclined to use it. Those trained in the seminars and workshops will be able to train other colleagues.
- The first group to be convinced is the top managers, who can induce the use of this instrument in priority projects and programs.

Exercise 2.1 Analysis of a Project

Instructor's Guidelines

Objective

✔ Analyze a project or program to evaluate its logical coherence, and identify indicators and means of verification for monitoring it.

Required resources

- 1 copy of the project or program for each participant.
- 1 orientation guidelines for each participant.
- 1 orientation guidelines for the instructor.
- 1 copy of the logical framework matrix for each participant.
- 10 transparencies.
- 1 transparency for the feedback information phase.
- 5 sets of markers for writing on the transparencies.

Instructions

- Request each participant to take the project to analyze and provide the guidelines for the corresponding exercise and the work sheet.
- Participants will read the project individually, using the guidelines to do the exercise (time: 40 minutes).
- After finishing the individual task, make sure that participants form their working groups.
- Supply resources to each group, give them instructions on the task, and indicate the time allowed for finishing the group exercise (40 minutes).
- After finishing the exercise, the instructor will go around and analyze and discuss results with each group; this task will be conducted by the instructor at the same time. Each will dedicate 20 minutes to each group.

Time suggested for this exercise

Individual work	40 minutes
Group work	40 minutes
Feedback	20 minutes[3] (per group)
	120 minutes

[3] When two instructors are available, each will work with two groups, dedicating 20 minutes to each group.

Exercise 2.1 Analysis of a Project

Participants' Guidelines

- Analyze a research project or program in your institution (or the one given to you), by following the steps established according to the indications below. Time: 40 minutes.
- After finishing the individual task, get together with your work group and analyze and discuss the answers with other team members, trying to reach a consensus for each case. Time: 40 minutes.
- The instructor will join the group to analyze results and will prepare a final synthesis (20 minutes).

Total time for developing the exercise: 100 minutes.

Indications for analyzing the project document

- Synthesize the problem that gave origin to the project (initial situation).
- Identify the objectives and arrange them by levels (goal, purpose(s), and products(s) expected).
- Analyze the coherence between the problem (initial situation) and the objectives.
- Identify project inputs (activities and resources required to carry it out).
- Analyze the coherence between products and inputs.
- For each objective and input, formulate the verifiable indicators and the means of verification that will enable monitoring the project.

Observation

If the case selected is very complicated, eliminate from the exercise the analysis at the level of inputs.

Exercise 2.1 Analysis of a Project

Worksheet

Matrix for the logical framework

Narrative summary	Verifiable indicators	Means of verification	Assumptions
Goal:			
Purpose:	Final situation		
Outputs:			
Inputs:			Initial situation

Exercise 2.1 Analysis of a Project

Example of a Project

If any participants do not have a project in their institution, they can use that of another participant, or the one that follows.

Presentation of a Research Project[4]

Unit: La Consulta Experiment Station - Mendoza - Argentina

Code: 5.9.0.2.0.0

Type of report	Year	CARIS
P	1988	1994-1999

Program: 0 / 3 Subprogram: 3/1 Project number: 3.9.0.8

Subject area: Breeding Lines:

Title: Obtaining onion cultivars and hybrids for the foreign market.

Year started	Year ends	Years for review
1989	2002	1994 & 1999

Area/sector

- ❑ Basic research
- ❑ Applied research
- ❑ Rotation of resources
- ❑ Extension
- ❑ Adaptive research
- ❑ Services
- ❑ Production

Persons in charge: Rubén N. Oliva - Claudio Galmarini

Folder: 10.956

Purpose:

Provide farmers and seed producer with onion hybrids and cultivars, adapted to the agroecological conditions of the diverse production areas in Argentina, and to the market requirements, especially the foreign market (Latin American and European).

Outputs:

Obtain onion varieties and hybrids for short, intermediate, and long daylight hours, with adequate quality and storage characteristics for the foreign market.

Degree of internal risk 5%

Justification

Due to lack of adequate germplasm

Degree of external risk 10%

Justification

Due to climatic conditions

[4] This workplan has been simplified for learning purposes.

Characterization of initial situation:

There are good possibilities of exporting onion bulbs off season (January - February) to the European market. However we should have more early-maturing cultivars or hybrids for the production of mature bulbs with good resistance to transportation and conservation conditions. Some cultivars are available, such as the Valenciana type, which adapt well to ecologic and internal marketing conditions. Most of these are produced or managed by INTA. Nonetheless, the varietal base has to be broadened to include superior, early- maturing (January - February) varieties or hybrids which also meet market requirements.

Characterization of final situation, in relation to objectives:

Farmers and seed producers have national cultivars and hybrids, adapted to the agroecological conditions of several production areas in Argentina. These meet external market requirements.

Agrovoc subscribers	Key words
Allium cepa Plant breeding Hybrids Seeds Argentina	Onion Genetic breeding Hybrids Quality Seed
Specialization	**Product**
F30 - Plant genetics and breeding	06.05 Bulb vegetables

Complete presentation/ complete report

Background

The center of origin of the onion (*Allium cepa* L., Liliaceae) has not yet been completely determined. Some say that it originated in the highlands of Iran and Pakistan, even though no wild onion forms are believed to exist there today.

Onions are a bi-annual plant, cultivated as an annual crop. Roots are fascicular and short. Leaves are fistulous, with a hollow blade and enclosing sheath, inserted opposite each other at the stem. Older leaves cover the younger ones, forming a tunicate bulb of various shapes. Externally, the bulb is formed by membranous or tunicate and very thin cataphylls; these are sheaths distended by bulb development. The fleshy cataphylls, or engrossed sheaths, are located toward the inside. Finally, in the center of the stem are leaves that have not yet developed and which will spurt in the following cycle. The disc, or stem, has very short internodes, is subconic, and constitutes the base of the bulb. Flowers and inflorescence develop normally during the second vegetative period over the extreme of a hollow floral stalk, forming a pointed appendix made up of an enclosing bract that opens up to release the flowers. The fruit is a trilocular capsule with one or two corrugated black seeds in each locule.

Depending on photoperiod requirements for bulb formation, onions can be classified as short-day (approximately 11.5 hours of daylight) or as long-day (more than 14 hours of daylight). Requirements of the intermediate types fall between these two averages. The three types have bulbs appropriate for local markets (short shelf-life), for storing, and for dehydration. In general, long-day onions are used for storage, while short-day onions are sold in local markets. Onions used for dehydration can be of either type.

The initiation of flowering in onions is regulated by environmental factors. The main factor inducing flowering is low temperature, similar to the way in which photoperiod affects the process of bulb formation. Flowering does not take place if plants are kept at a temperature above 17°C; optimum temperatures for inflorescence are found between 9°C and 13°C. These values vary depending on the cultivar; some cultivars are not affected by low temperatures. The threshold of vernalization seems to be found between 12 and 24 true leaves. After formation of the floral primordium, long daylight conditions are important for the development of inflorescence. Studies on cold requirements, existence of a juvenile period, and photoperiod requirements that promote flowering and subsequent seed formation have not been conducted for the cultivars used in our country.

Once the plant is induced to flower, the vegetative apex stops producing leaf primordia and starts the process of inflorescence. This inflorescence can have at least two thousand flowers per umbel. The scape or floral stalk is in fact a single stem internode that starts out by being a solid structure but becomes hollow as it grows. The number of scapes per bulb varies with the species, between one to more than ten, depending on the number of lateral buds in the bulb. The umbel is a conglomerate of many small inflorescences having five to ten flowers. These open in an irregular sequence; thus, flowering can last two to more weeks. As the plant can have more than one scape, total flowering can last more than a month.

Each flower has six stamens, three carpels united in a pistil, and six tepals. Each pistil has three locules, each having two ovules. Flowers have a nectar-bearing gland to attract insects. Anthers release pollen three to four days before the stigma is receptive (protandry), thus favoring cross pollination.

Pollination control is very difficult due to the enormous amount of perfect small flowers per umbel. Selfing is not commonly used in onion cultivation because loss of vigor due to consanguinity in this species can be observed as early as the second generation (S2). For hybridizing, the difficult breeder has two options: 1) emasculate the flowers of one of the lines (which is a tremendously), or 2) make a fertile x fertile cross, by caging together two lines and pollinating with flies or bees. This method can be used efficiently only when the lines are sufficiently different to allow identifying the hybrid. With the hybrid bulbs identified, the F2 or backcross takes place. Once the selection process has started with the segregating population, self-pollination is necessary for two generations to determine which progeny is the one desired. To obtain self-pollinated plants, small cages are used to avoid undesirable crosses. Once the progenies are selected, bulk multiplication is made of each progeny in 0.6 x 0.6 m cages. After a line is selected for its marketing potential, seed increase can be done in larger cages or isolated fields.

The use of cytoplasmic genetic male-sterility facilitates crossing tremendously. This character is determined by the joint action of a recessive gene and a cytoplasmic factor. The factor is designed as N for a normal fertile cytoplasm and S for the sterile one. The gene is Ms/- for the fertile condition and ms/ms for the sterile. Several combinations are possible between the cytoplasmic factor and the gene that produces fertility or sterility:

Male-sterile line (A)	Fertile line (B)	Progeny
Sms/ms X	Nms/ms	Sms/ms
	NMs/ms	SMs/ms
		Sms/ms
	NMs/Ms	SMs/ms
	SMs/Ms	SMs/ms
	SMs/ms	SMs/ms
		Sms/ms

To keep a male-sterile line, an Nms/ms maintaining line has to be kept. A different combination would yield fertile or segregating lines. Using any male-sterile line and any fertile B line, the breeder can develop a new pair of A-B lines through backcrossing; in this case line A will be identical to B except for the fertility character.

The best way to develop new A lines is to make trial crosses in open pollinated cultivars with existing A lines to identify the ms/ms genotypes in those cultivars. Cultivars generally present about 5% B lines. Then the breeder can follow a backcrossing program to develop the new A line, similar to the maintaining parent. Another possibility is to make crosses between existing B and C lines to get new B lines and then proceed with the program described above. A third method to obtain new A lines is through observation of extensive seed production fields. Many cultivars present a low frequency of male-sterile lines. Plants identified as sterile must be crossed with fertile neighboring plants to identify a maintaining line.

Relatively thorough information is available on genetic studies of different characters. Among these are studies on color inheritance, shape, solids, single center, premature flowering, resistance to sprouting, color and shape of leaves, resistance to pink root, resistance to thrips, and photoperiod requirements for bulb formation.

Onion breeding techniques have improved several characteristics of this crop, such as reduced premature flowering, resistance to sprouting, larger number of cataphylls, and other aspects of bulb quality, yield, uniformity, and resistance to pests and diseases.

Argentina has extensive geographical zones with favorable climatic conditions for onion production. Since these areas are located in different latitudes, the market can be supplied throughout the year. The six most important onion-growing regions are: Mendoza, San Juan, Santiago del Estero, southern Buenos Aires, Córdoba, and Salta. Mendoza and San Juan grow 54% of national production: over 300,000 t per year, on more than 15,000 ha. than 15,000 ha.

Excellent possibilities exist for exporting onion bulbs to the Latin American and European markets, but we should have more early-maturing cultivars and hybrids for mature bulb production. These should be resistant to transportation and conservation conditions. The market for dehydrated onion subproducts is also increasing; thus materials have to be developed that have high total solids and resistance to pink root.

INTA produces or breeds most of the existing good cultivars. These adapt well to agroecological requirements and meet internal market requirements. However, the varietal base needs to be broadened to offer superior cultivars or hybrids, also adapted to external market requirements.

2. Working hypothesis

The obtaining of early-maturing onion cultivars or hybrids, adapted to the agroecological conditions of several production areas in Argentina, and made available to seedsmen and producers will satisfy external market requirements.

3. Objectives

Obtain short-, intermediate-, and long-day cultivars or hybrids having adequate quality and conservation characteristics for the external market.

4. Materials and methods

Work is being conducted in order to obtain early-maturing cultivars and hybrids for sale in the external market of mature bulbs with resistance to transportation and conservation conditions. Cultivar type: Valcatorce.

Obtention of open-pollinated cultivars:

First year:

- A varietal nursery of cultivars and introductions will be established to look for sources of desired characteristics. This nursery will be repeated every year to keep an updated germplasm bank useful to the breeding program.
- 200 bulbs will be selected from each promising line or cultivar available for selfing, without exerting too much pressure for the desired characteristics. Conservation of the bulbs.

Second year:

- At least 100 bulbs among those conserved will be planted for self-pollination and fertile x fertile crossing, in order to increase variability if necessary.

Third year:

- Bulbs will be planted in 6-m rows with seed from S1 or F1. Low planting densities will be used to allow bulbs to grow without unfavorable plant competition. A strong selection pressure for the desired characteristics will be exerted, except for the F1 bulbs since these are grown for F2 seed production. Approximately 100 bulbs will be selected from each progeny. Of these, the 10 best will be selected after conservation for the program's production.

Fourth year:

- At least 100 bulbs among those conserved will be planted for self-pollination and fertile x fertile crossing, in order to increase variability if necessary. A second cycle of self-pollination will be conducted. If the materials have sufficient uniformity they will be bulk-multiplied using 3 to 5 bulbs to accelerate obtention of cultivars.

Fifth year:

- This year's progenies will come from bulbs from two self-pollinated generations or from F2. Even greater selection pressure will be exerted than in the third year. Materials for conservation will be selected with the process described for this year.

Sixth year:

- Progenies selected for their uniformity in the characters sought will be multiplied in bulk, using 12 to 15 bulbs and several repetitions per progeny. This will be done because the bulbs will still be heterozygous for several loci and the probability of obtaining a uniform cultivar will increase with the repetitions.

Seventh year:

- Bulbs will be produced from bulk seed under management conditions similar to those of a commercial crop. Approximately 200 bulbs will be selected from each progeny. Further strong selection will be done after storage.

Eighth year:

- The best 100 bulbs from each progeny will be planted in cages to increase seed availability. Phenologic and yield data will be recorded from the seed production activity.

Ninth year:

- Comparative trials will be conducted at the experiment station and in demonstration plots in farmers' fields in different localities. Sufficient bulbs will be selected from the progenies that made it through seed production evaluation in large cages.

Tenth to thirteenth year:

- Seed from the cultivars obtained will be increased, trials will be conducted in farmers' fields, resistance to transportation conditions and other postharvest and marketing characteristics will be evaluated. The new cultivars will be released.

Obtention of hybrids:

This program assumes availability of A and B lines adapted to breeding, which in our case refers only to male-sterile lines of cv. Valenciana. Simultaneously with this program's activities, hybrids will be sought from crosses between Valenciana and other earlier-maturing cultivars using available male-sterile lines of this cultivar.

Both bulbs and seed will be produced during the same year as a way to reduce by 50% the number of isolation cages required.

First year:

- Fifty to 100 bulbs will be produced of each cultivar adapted to the target production areas as potential from maintaining parents (B) and as transformers of the original male-sterile lines.
- The hybrid Valenciana (A) x Torrentina (C) will be obtained in order to have Spanish-type materials with the good conservation characteristics of Valenciana, but earlier maturing.

Second year:

- These bulbs will be planted together with line A (in our case, male-sterile Valenciana lines) in isolation conditions. Seed produced in each umbel will be carefully identified.

Third year:

- Bulbs from self-pollination and from crossing trials will be grown. All sterile and fertile pairs will be separated and planted in rows in that order. Bulbs from fertile lines and having the desired characters will be selected. Approximately 25 healthy bulbs from the corresponding sterile maintaining-line will be selected. (A strong selection pressure will not be necessary at this stage for the sterile lines.) When a fertile line is discarded, its corresponding sterile line will also be automatically discarded.

Fourth year:

- Bulbs will be produced from each pair (S2 and RC1). Since we are dealing with a second self-pollinated generation, lines B will show uniformity and lines A will start to be similar to their maintaining parents; this will however depend on the original similarity of the sterile line with its current maintained. The best bulbs from the fertile line will be selected and, whenever possible, bulbs of the sterile line that most resemble those of its maintaining parent will also be selected. Conservation of bulbs.

Sixth year:

- Bulbs will be planted to carry out the third self-pollination and the second backcross (S3 and R2). Sterility will continue to be confirmed.

Seventh to eleventh year:

- Planting will be done to obtain fertile lines which by this time will be very uniform and will have reduced vigor because of consanguinity. Male-sterile lines will have 87% of the maintainer's genes. The best progenies will be selected for desired traits. From here on, during two generations, B lines selected will be multiplied in bulk, using 20 bulbs. A lines will be backcrossed to increase their resemblance to the pollinating father.

Crossing trials for the obtention of a hybrid:

- Selected A lines will be crossed with unrelated B or C lines for specific breeding objectives such as uniformity, yield, and resistance to pests and diseases. Multiple crossing possibilities will be tried in order to place the same group of A lines in many cages, each one having a different fertile line.
- F1 seed from each crossing will be planted in plots located in different commercial onion production zones for evaluating their potential as hybrids. These trials must be repeated for at least 3 years to make sure that the materials are well adapted.

5. Target population

Seed and bulb producers and commercial onion farmers in the different growing areas of the country, development services, and agricultural technology extensionists.

6. Bibliography

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			CARIS
Title: Obtaining onion cultivars and hybrids for the market and industry type			
Program: 03	Subprogram: 031	Project No. 3908	Type P Year: 1988

Chronogram of Activities

	Year											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Planting of seedlings				X	X	X						
Transplanting									X	X		
Bulb harvesting	X	X										
Conservation				X	X	X	X					
Selection of bulbs		X	X					X	X			
Planting of bulbs								X	X			
Rearing of flies										X	X	
Cages											X	X
Sterile lines selection											X	X
Seed harvest	X	X										

			CARIS
Title: Obtaining of onion cultivars and hybrids for the market and industry type			Type P
Program: 03	Subprogram: 031	Project No. 3908	Year 1988

Personnel from the Unit involved in the plan:

Last and first names	Folder	Specialization of technician	Time available for the project (%)
OLIVA, Rubén N.	10.956	Breeder	15
GALMARINI, Claudio	14.364	Breeder	15
LUCERO, Carlos C.	6.684	Technical assistant	25
DELLA GASPERA, Pedro	14.347	Technical assistant	25
GUZMAN, Vicente	14.504	Field personnel	25

Personnel from other units at INTA involved in the project:

_____ _____ _____

_____ _____ _____

_____ _____ _____

Personnel from other organizations participating or cooperating with the project:

_____ _____ _____

_____ _____ _____

_____ _____ _____

Conducted by agreement with:

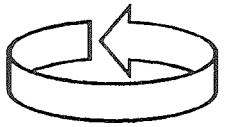
Provides elements: YES - NO
If YES, indicate so:

Provides funds: YES - NO
If YES, indicate so:

Provides personnel: YES - NO
If YES, indicate so:

Exercise 2.1 Analysis of a Project

Feedback*: Obtention of Onion Cultivars and Hybrids for the External market



Descriptive summary	Verifiable indicators	Means of verification	Relevant assumptions
Goal: Increase supply of export onions fit for the European market and other off-season markets	Volume of exported onions	• Custom's export records • FAO statistics	• Stable exchange rate • Constant demand for onions
Purpose: Cultivars fit for demand and agroecological requirements	**Final project situation:** At the end of 13 years, availability of at least two early-maturing cultivars adapted to the agroecological conditions and to European market requirements	• Final report • Record of cultivars • Reports on field trials in farmers' fields	• Favorable climatic conditions • Extensionists collaborate with trials in farmers' fields
Output: • Promising, "Valenciana" type, varieties obtained • "Valenciana" type hybrid obtained	Desired bulb characteristics achieved (spherical, sweet, resistant to transportation conditions, narrow neck, and many protection cataphylls)	• Photographic file • Sampling panels (report) • Progress reports	• Availability on time and in the appropriate way of germplasm with the desired characteristics
Inputs: • Male-sterile and SUPPORTING lines • Isolation cages • Flies • Bibliography • Fertilizers, crop management requirements • Transportation • Per diem for travelling to production zones • 1 breeder • 1 field technician • Activities: planting of seedlings, transplanting, bulb harvesting, conservation, selection and planting of bulbs, rearing of flies, caging, selection of sterile lines, seed harvesting	Lines obtained in previous research projects Budget execution and working chronogram Contracts	• Final report of projects completed • Germplasm bank file • Budget reports • Reports of highlights • Personnel records	**Initial situation** • Possibilities for off-season onion exports • Increasing demand from the Northern Hemisphere, especially between January and February • Acceptance of Valenciana-type onions • Lack of early-maturing, good-quality cultivars, adapted to the agroecological conditions of different national regions • Known marketing and export channels • Availability of some male-sterile lines with seeked characteristics

Source: Oliva, Rubén y Galmarini, Claudio, 1989

*/ / If the amount of time provided is not sufficient, the enclosed project example and this matrix (having filled in the first column) will be turned in.

Summary

This sequence focuses on projects as the central units that link the planning, monitoring, and evaluation process of agricultural research at the operational level.

The project was defined as a set of interrelated activities in which inputs (activities and resources) are specified for achieving specific results within a set time limit.

The project cycle was analyzed, identifying the following phases: identification of problems and research areas, preparation of proposals, review of proposal, approval and allocation of resources, implementation and monitoring, evaluation, and diffusion of results.

Efficient monitoring can only be done if the project has been coherently formulated. The logic that the project should have during its preparation phase was analyzed taking into account: clear formulation of problem within the framework of previously established priorities, adequate relation between the problem to be solved and the specified objectives, coherent formulation of objectives at different levels, appropriate formulation of hypotheses, appropriate relationships between objectives and the resources required for implementing the project, and the analysis of external factors or conditions that can affect the project's development.

The methodology must be clearly defined, and it must be adequate for the type of research project proposed.

The logical framework was proposed as an instrument to facilitate project preparation, monitoring and evaluation. The logframe structure was introduced, with the basic concepts that make up this structure: the initial situation, the objectives at different levels, the required inputs, the relevant assumptions or conditions that cannot be controlled but which affect the project's development, the indicators to measure the degree to which objectives have been fulfilled, use of project inputs, and the corresponding means of verification.

The "vertical" and "horizontal" logic of a project logframe was analyzed.

Indicators and means of verification for monitoring a project and their requirements were discussed in depth. In short, indicators must be relevant, valid, measurable, and independent.

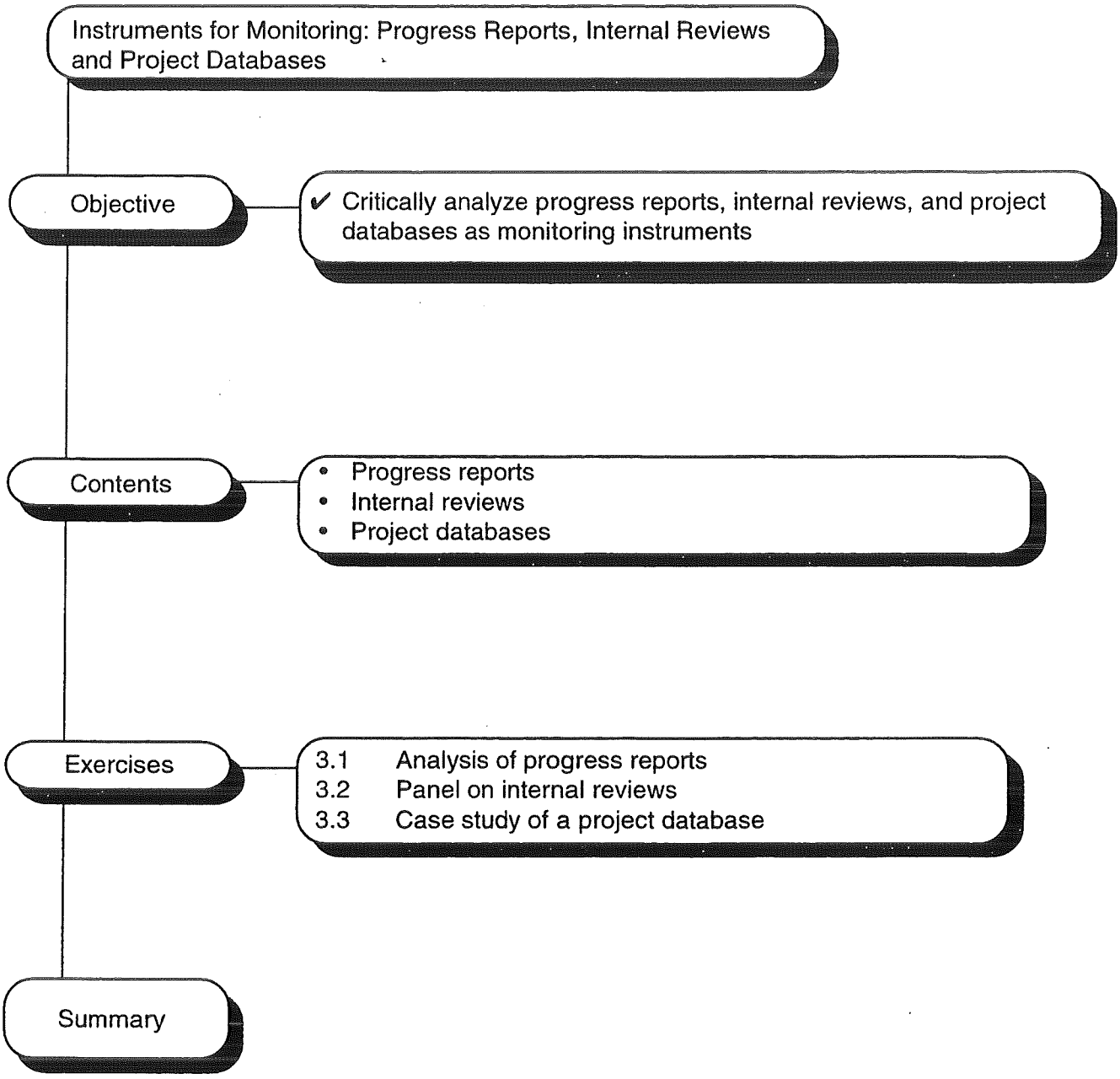
The following stages were suggested for elaborating a project logical framework:

- Characterize the initial situation (the problem).
- Formulate objectives (elaborate the narrative summary, including goal, purpose, outputs, and inputs for the project).
- Identify relevant assumption for each level of objectives.
- Verify the vertical logic (among inputs, outputs, purpose, goal, and assumptions).
- Select indicators for verifying the achievement of each objective and use of inputs.
- Specify means of verification for each indicator.
- Verify the horizontal logic (among objectives, indicators, and means of verification)
- Review the complete logframe

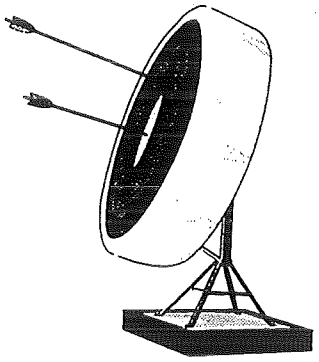
Finally, recommendations were made to introduce use of the logframe in project design and monitoring in agricultural research institutions. These recommendations include: make procedures and formats compatible, train key personnel in the use of the logframe and in project management, incorporate this in some pilot experiences, and—prior to this—make sure that top management is convinced of the usefulness of the logical framework.

Sequence 3. Instruments for Monitoring: Progress Reports, Internal Reviews and Project Databases

Flowchart for Sequence 3



Objective of Sequence 3



After finishing studying this sequence, participants will be able to:

- ✔ Critically analyze progress reports, internal reviews, and project databases as monitoring instruments.

Introduction

This sequence briefly presents three monitoring instruments frequently used in agricultural research in Latin America and the Caribbean. Information provided on each instrument will enable participants to have analytic tools and evaluation criteria applicable in their institutions.

Each monitoring instrument should be used as a component of the PM&E system as a whole. Therefore, the design and effectiveness of each one must be considered in terms of its contribution—jointly with other instruments —to PM&E, and to improving management and the performance of researchers.

Instruments used should not become a bureaucratic burden. They should be as simple as possible, be compatible, always provide feedback to researchers, and help support researchers, managers, and directors in performing their work.

Analysis of the 13 PM&E case studies in the Americas shows that different monitoring instruments are used at different institutional levels (project, program, and institute) (Table 10).

Table 10. Monitoring instruments and level at which they are organized (Org) and implemented (Imp)

Instruments	Institution		Program		Project	
	Org	Imp	Org	Imp	Org	Imp
Management committee	X	X				
Internal review	X	X	X	X	X	X*
External review	X	X				X*
Quarterly or bi-annual report	X					X
Annual report	X	X		X		X
Project databases	X	X		X		X
Regional council meetings	X					
Field visits			X		X	X

* Internal and external reviews are sometimes organized for major projects with external funding.

For example, field visits are most common at the project level, while meetings of directors are most common at the institute level.

Monitoring activities tend to be more frequent and involve more detailed information at lower levels; they are more general and less frequent at the institute level. Information generated at lower levels of the management hierarchy is transmitted up to higher levels, where it is aggregated for use in planning, evaluation, and decision making related to on-going activities.

Case studies conducted indicate that written reports and internal reviews are frequently used in research institutions, but have several deficiencies in their organization, management and the use of information presented. Researchers and persons in charge of projects, programs, and institutions invest a great deal of time in meetings and in preparing reports. However while these meetings and reports may satisfy external information requirements, they seldom are useful for improving the managament and outputs of research. In this Sequence we offer some recommendations for improving reporting and internal review procedures.

The increasing demand for information on research programs, the need to modernize management, and the development of information technology have motivated and facilitated the establishment of computerized information systems in agricultural research institutions. Experience has demonstrated that for monitoring, the research project is the most appropriate unit for generating and analyzing information. The research project brings together persons in charge, input application and production results. Therefore efforts are being made throughout most of the region to develop databases with information on projects. To date experiences have been mixed; some have been successful, others have failed, but have allowed for the establishment of criteria on the design and operation of project databases in future.

Progress reports, internal reviews, and project databases were selected in the development of this sequence as models of monitoring instruments. With the concepts presented, participants will be able to analyze the design, application, and use of other instruments that might be more useful in their own institutions.

Progress Reports

Research results must be communicated in one way or another, through written reports, oral, or visual presentations. The most common way of presenting information on a research project is the written report, which can be supplemented with oral presentations and audiovisual aids.

People at different decision-making levels in research institutions normally invest significant amounts of time in preparing progress reports. However, they consider preparing reports as a bureaucratic and not very useful activity since those that receive the reports seldom show much interest in their content, make no comments on them, and seem to disregard them in decision making.

Uses

Reporting involves the collection and analysis of information related to agricultural research activities, resources, and results, and its presentation so as satisfy the needs of different groups or audiences. Research results may be recorded and presented to scientists, managers, producers' associations, goverment agencies or donors. Reports can allow managers and others to compare research progress to pre-established objectives and goals, to identify significant deviations, and to take the necessary actions. However, often reports seem to be filed, unread, and there seems to be little followup.

Since researchers seldom feel that their report are used, report preparation is generally seen as a tedious, unproductive requirement. However, it can be very useful in decision making, in consolidating and scientifically documenting research achievements and findings, and in disseminating results among the different research clients or beneficiaries. Preparation, presentation, and revision of reports can be a useful element in the scientific process and for professional development since it forces to periodically take stock of their work, it helps disseminate information during the research project's execution (cycle) and, it provides evidence on research findings and impact to interested audiences.

Types

Several types of progress reports can be useful in a research organization; for example:

Each type of progress report has its own style, contents, and difussion channel according to the audience to which it is addessed.

- Technical-administrative reports
- Progress reports on research projects, programs, and institutions
- Final projects reports
- Special reports

Technical-administrative reports

Generally, these are administrative and financial reports required by governments and donors, containing information on the expenditure of funds over a specified period of time, in addition to a brief description of the project's technical aspects. The project leader usually prepares this report and submits it for review to the institute's director, program leader, or donors. Its format varies depending on donors' requirements.

Research progress reports

Annual reports are commonly prepared by research organizations. Researchers may prepare an annual technical report on experiments and field trials. This is afterwards sent to research managers. Sometimes these reports are formally presented in annual program reviews or in other meetings and technical seminars.

This type of report generally summarizes a research project's achievements during the year. It commonly includes technical information. Its analysis and the interpretation of data collected throughout the year allow managers to evaluate the project's scientific quality. It can also include financial information to compare the use and expenditure of resources with what had been planned.

Annual reports for research projects can be consolidated to prepare program reports and the institution's annual report.

The format used to prepare annual reports should not be complex, while emphasizing the information considered important. The use of standardized formats facilitates comparison, synthesis, and the aggregation of information to be used at the upper management levels, i.e., the program or institution. (This standardization is also essential for computerized management information systems.)

Final project report

Ideally, at the end of a project a final report is prepared which summarizes the project's activities, and principal achievements. Such a report complements the routine progress reports, but should be more lengthy, substantive and analytical.

Content of a final project report:

- *Project or activity title*
- *Report summary*
- *Objectives and expected results*
- *Methodology used*
- *Main achievements and findings*
- *Problems and possible solutions*
- *General conclusions*
- *Financial summary (for administrative reports)*

In addition to presenting the project's initial objectives, justification, methodlogy and expected results, a final report should contain information and conclusions on the following topics:

- Primary experimental data collected during research (for future use by other researchers.)
- Important scientific achievements and findings of significance for policy makers.
- New research areas for future projects.
- Lessons on the project's execution that can serve for other projects
- Indicators for future impact analysis.

This report should start with an "executive summary" of the most significant findings and lessons.

From a strictly research stand point, final project reports are perhaps the most important of all reports prepared by an agricultural research organization. However, in practice they are seldom prepared, because when a project is completed, project staff are quickly deployed to other activities.

Special reports

Some special reports related to project execution may be needed. For example, a field evaluation report can be prepared by the evaluator during a visit to an experimental site to observe research work. This report may include comments on research design, execution, achievements, problems and recommendations. A technical report describing details of a technology recommended to farmers, can be prepared by a researcher. It might specify the agroecological and socioeconomic conditions for which the technology is designed, as well as benefits that may be derived from it. An impact study can be prepared by an evaluator after research results have been disseminated, to estimate the use and effects of technologies on production, consumption, employment and the environment.

Preparation

Agricultural researchers should not limit themselves to studying problems and finding solutions, they should also communicate results to those who can benefit from this information (Arnon, 1978).

This section will present five aspects of preparing and using progress reports.

- Incentives for preparing good reports
- Formats and instructions
- Periodicity
- Audience and style
- Reports at different decision-making levels
- Distribution and use of reports

Incentives for preparing good reports

The presentation of progress reports is considered in many organizations as a bureaucratic obligation, and not as an opportunity to review research, improve on it, or distribute its results. What is needed is to give clear signals that progress reports are valuable instruments for research management and the diffusion of results.

Experience in different organizations shows two very important stimuli for preparing progress reports:

- The **use of reports** in decision making and preparing other synthesis or diffusion documents.
- **Comments and reactions** from managers on the reports presented by scientists.

These types of positive stimulation in a research organization are much more effective than the obligation to present reports.

Formats and instructions

The advantage of using **predefined formats** for preparing reports is researchers can quickly fill them out and managers can quickly compare results presented for different projects. However, standardized formats may hinder reporting unexpected events or situations not included in the predefined categories or items. Therefore, even where most aspects of preparing reports are standardized, a certain level of **flexibility** should also be possible.

Formats have the advantage of orienting report preparation. Brief instructions can facilitate comprehension for preparing the report and allows for unification of the most important criteria.

The inset is an example of a format for a bi-annual progress report.

Bi-annual Progress Report

Program _____

Project _____

Person(s) in charge _____

Objectives for the period _____

_____

Progress in relation to objectives _____

Activities planned for next period _____

_____

_____

Required modifications (budget, schedule, methods, etc). _____

_____

Frequency of reports

The frequency of progress reports depends on the purpose, type of information, and audience to which they are addressed. For example, project progress reports are usually more frequent than those for institutions. Reports can be prepared according to fixed schedules, or at crucial moments during the execution of research . They can also be done at different management levels for several purposes.

Progress reports are generally prepared quarterly, bi-annually, or annually, depending on administrative requirements. Progress reports on agricultural research activities should be schedule in relation to agricultural growth cycles. Experience indicates that annual reports are generally more useful than more frequent ones.

Audience and style

Reports have different audiences and each audience has specific information needs. The style and format of a report should depend on the audience, in such a way that the person interested can quickly and efficiently find and comprehend the information he/she needs.

Following are some of the audiences for which research reports are prepared.

- **researchers** working in related areas and whose language is generally technical;
- **extensionists** in charge of transferring practical knowledge to farmers
- **planners** who need to keep up-to-date on research progress and who needs this information to plan future research.
- **professors** in agricultural schools who need to update their knowledge and transfer it to their students;
- **farmers,** who are the main intended beneficiaries of the research process;
- **managers** who need the information to guide and control activities at different levels in their institution;
- **donors** who require information on the use of resources they have provided.

Reports at the different decision-making levels

Reporting is a critical activity at different management levels. Good management requires a flow of information from the researcher level, where experiments are conducted, to the higher administrative levels, where decisions are made. During this flow, information has to be synthesized and "translated", having the user in mind.

This flow of information can link different management levels through summaries and syntheses (for the institution, center, or experiment station) based on technical research reports (prepared by researchers). Research managers at each level can supervise the preparation of reports by researchers and consolidate a clear summary report to be delivered to the managers at higher levels.

Methods and technical data predominate as subjects in discussions among researchers; but what the upper levels need is a more general vision of progress and the problems related with project. Therefore, the focus of monitoring at higher levels is on the main progress elements, the breakthroughs and results achieved, and on problems found. Research results and achievements have to be translated here to relate them directly with users' needs and decision making. Clear summarize must be included and the content must be adjusted to the needs and interests of specific audiences at each management level.

Distribution and use of reports

The way reports are distributed is crucial to decision making. A monitoring system should be developed in such a way that it reaches all management levels with reports on relevant information at the moment required.

Preparation and distribution of reports is expensive; thus, reports must be designed for specific users. They should be distributed on time to the appropriate users for decision making.

Often, the worste failure of a monitoring system is not using the information generated. This generally happens because information does not reach the person who needed it, does not arrive on time, or is not properly prepared (brief, clear, and synthesized).

These problems highlight the importance for those who request and distribute progress reports of periodically evaluate the usefulness and use of these reports to those who receive them. Based on these periodical evaluations, procedures for preparing them can be improved and thus increase their usefulness.

Problems

The value of progress reports is frequently underestimated by researchers and managers. Consequently, institutions do not assign a high priority to preparing reports. As a result, many research findings are not documented in a way that could be useful for research administration.

Some common problems of progress reports are:

- *Standardized formats do not exist or are not used.*
- *Reports are not presented at the right time*
- *Quality of reports is poor: little substance and analysis, and poorly written.*
- *Synthesis reports are not prepared at the program or institution levels.*
- *Reports are not used to make decisions and scientists do not receive feedback information.*

Progress reports are more useful when they become integrated through the flow of information with decision-making at the different levels of the national research system. In this sense, the style and contents of progress reports must be consistent with future users' needs.

It is advisable that the preparation of progress reports be linked to other management instruments (i.e., annual reports to be presented during annual revision meetings) so that information flow takes place in decision making at different execution levels. Reports thus become useful tools in research management and accountability.

Requirements for reports in the organization should coincide if at all possible with those of donors. This is important because it avoids duplicating efforts and makes the process of collecting, analyzing, and writing up information more efficient.

What Makes a Good Report?

Summarizing the main points covered in this section, a progress report can be evaluated on the basis of the following criteria:

- Complementarity with other management instruments.
- Adequate format and organization.
- Appropriate frequency.
- Style in accordance with audience.
- Content relevant to audience.

Internal Reviews

Internal reviews are meetings conducted at the level of agricultural research projects, programs or institutions with the object of monitoring the development of activities conducted, discussing highlights and results, identifying problems and opportunities, enhancing motivation and interaction among researchers, and providing inputs for evaluation and reprogramming. Periodicity of these reviews varies, depending on the research activity to be evaluated and the institutional level at which it is developed.

Internal reviews are an excellent means for stimulating professional dialogue, achieving consensus on program issues, and generating information for planning and evaluation. Internal reviews are a monitoring instrument frequently used in agricultural research institutions in the region. However, in many cases, internal reviews are poorly organized, documentation is inadequate, or there is litlle followup after the event.

This section analyzes the objectives and uses of internal reviews in monitoring, and provides criteria for evaluating the organization, development, and results of an internal review.

Uses

Internal reviews can be used in at least seven ways:

- Checking on activities and results
- Problem identification
- Identification and analysis of possible solutions
- Re-evaluating priorities
- Annual planning
- Documentation
- Motivating and guiding scientists

Checking on activities and results. The first use of an internal review is verifying the fulfillment of activities and results in relation to goals established during planning. Therefore, the existence of plans is fundamental for an internal review. Plans should have clearly established objectives, goals, and chronograms for the agricultural research unit to which monitoring will be applied.

Monitoring of agricultural research activities should include at least four dimensions:

- **Context** - justification of work, main assumptions, and current situation.
- **Objectives and design used.**
- **Implementation** - activities carried out, problems and solutions.
- **Results** - in quantity and quality, with relation to objectives.

It is advisable to provide part of this information to participants in advance so that the meeting can concentrate on substantial issues. Conclusions should arise during discussions, and consensus reached among the persons in charge (researchers) and reviewers.

Problem identification. A second use for internal reviews is detecting problems limiting the achievement of objectives. Problems may be classified according to their origin:

Internal problems - for example, the experimental design was not adequate to produce the information required.

External problems - inputs took longer than expected to arrive.

Other classifications may relate to the type of problems: conceptual (project design) vs. operational, or research design problems vs administrative problems. Identification of problems should be clear and precise, and avoid personalizing them. Persons in charge of project should identify, as far as possible in advance, the problems causing the greatest limitations in fulfilling what has been planned. Otherwise a review meeting can become to long and tedious.

Identification and analysis of possible solutions. After problems are identified possible solutions need to be identified and assessed. For example, the researcher could propose a new experimental design; the project head could authorize contracting extra personnel; the experimental station manager could allocate use of a new plot; the financial director could authorize additional expenditures. It is then necessary to consider if the solution is feasible. For example, constructing a drip irrigation system is not likely to be in an experiment station with financial problems. In each case, several alternative solutions should be considered (i.e., contracting temporary labor, or purchasing a harvesting machine).

When several problems arise at the same time, priorities must be established. Needs should be faced with the availability of resources. To optimize use of resources, reviewers should have as much information as possible on alternative solutions. Personal biases and preferences should be avoided.

Re-evaluating priorities. Re-evaluation of priorities, or objectives, in an internal review can arise from two different situations: (1) it is not possible to find a viable solution to the problem originally identified; or (2) changes have taken place in the environment.

Before suggesting a change of priorities or objectives, careful consideration should be given to the degree of autonomy of those participating in the review. Autonomy is limited at inferior hierarchical levels. For example, in an internal project review, autonomy is related to the methods and materials used, while a change in objectives should be submitted for consideration by the respective program.

Changes in priorities or objectives should be formulated in consensus with participants, considering the availability of resources and the coherence with priorities. Changes of this nature should remain within the general framework established during planning.

Thus, re-evaluation of priorities or objectives is not the end objective of internal reviews. If this is the conclusion, it must be considered as an intermediate product to be used in other instances of the PM&E process.

Annual planning. An important function of internal reviews is planning activities for the following period. In some institutions, two meetings are organized each year to avoid extending the length of each meeting. One is organized to review activities conducted during the previous period (generally one year), and another to plan activities for the following period.

Documentation. Another use of internal reviews is generating information for "institutional memory", for evaluations, and for future planning exercises. If internal reviews are combined with preparation of annual reports for research activities, a useful record can be created of research work and its results. Internal reviews can be effective instruments in preparing for external evaluations. Well-organized and documented, they can also be a useful for medium and long-term planning.

Motivating and guiding scientists. Internal reviews, with ample discussion among scientists and directors, can motivate and guide researchers toward institutional priorities.

Summary. The main contribution of an internal review is facilitating and institutionalizing communication among scientists and the different hierarchical levels of a research institution. Internal reviews are an incentive for compiling information and elaborating progress reports. They can also provide information for evaluations and for planning.

Organization

The usefulness of an internal review as a monitoring instrument basically depends on its organization and execution. These responsibilities must be assigned to a person or team.

Identification of objectives. All internal review meetings should have clear objectives (i.e., review all programs of a research institution, or review in depth all the work of a specific program). Themes to be covered should be established and then developed during the meeting. Both objectives and themes should be clearly transmitted to participants in such a way that each one of them can prepare the corresponding presentations and reports.

An internal review meeting should cover a limited number of objectives and themes. This is the only way to keep discussions, analyses, and recommendations sufficiently in depth to be useful for decision making.

Reviewing group. An internal review, generally speaking, is an extensive exchange of information among members of a program or institution; in this sense it serves as a self-evaluating group mechanism. Nonetheless, the process may be formalized by forming a review panel. The panel group must have a chairperson in charge of directing the meeting, and a number of other reviewers. (as a general rule, four or less.)

The panel's chairperson should be a good leader with knowledge of group management. The reviewers should be familiar with the review's objectives and know the subject matter being treated. At least one of the reviewers should have the capacity and authority to make high level decisions to guarantee the viability of recommendations (for example, the institute's director could be included in the review panel). Occasionally, persons that do not belong to the unit being reviewed are included in the review panel. This has its advantages and disadvantages. Advantages may come from the objectiveness of the person that has not been involved in internal unit operation. Disadvantages arise from inhibitions that participants may feel during the discussions in front of "outsiders."

Documentation. Prior to the meeting, all participants should receive appropriate documentation. Clear and concise progress reports can help shorten the length of presentations and focus discussions on relevatn subjects. This documentation can include reports prepared in previous reviews, especially if one of the objectives is to follow up on previous recommendations.

If reviewers receive reports beforehand, they can prepare comments and suggestions. The meeting's co-ordinator is responsible for ensuring that documentation is circulated on time. To ensure subsequent use, a file should be kept of all information given out for the internal review.

Oral presentations. Establishing and abiding by time limits for presentations is very important, to allow sufficient time for discussions, analysis, and preparing recommendations.

Speakers must receive appropriate instructions on the time available and the content. The co-ordinator should recommend that presentations be as specific as possible, emphasizing the presentation of results and future implications, and avoiding methodological details (i.e., treatment replication records).

As a rule, brief presentations (10 to 20 minutes) are more effective than long presentations (over 30 minutes). To be informative and effective, presentations must be well prepared and structured. Visual aids are also very helpful.

During agricultural research reviews, field visits are frequently advisable. These can be supplemented with a presentation to highlight its objective or make it clearer. In many cases, this has to be replaced by visual aids (photos or videos) because of time limits, logistical problems and costs.

The review panel should evaluate presentations in both terms of their, content, and their presentation.

Most agricultural research institutions have communications units or departments. Communications personnel can play an important role in preparing the meeting and its presentations.

Managing the meeting. The effectiveness of an internal review depends greatly on how it is managed. The meeting should focus on presentations and discussions which enhance the formulation of constructive criticisms and practical recommendations.

The meeting's chairperson should avoid the polarization of discussions and should promote the participation of junior research personnel. Interventions should be short and precise, and within the subject established in the agenda. Discussions should be interrupted when information is sufficient to arrive at a conclusion or make a decision. Personal references should be avoided, or references to facts different from those in the development of the work.

Each session should be managed by a chairperson. A secretary should take notes of main points of discussion, and write down conclusions. At the end of each subject or at the end of the meeting, either the chairperson or the secretary should make a summary of the conclusions drawn and the decision taken.

Flexibility is needed within the general program for adequate discussion of subjects arising during the meeting.

Size of the meeting. Beyond a certain number of persons and a certain number of themes, an internal review can become innefective. Discussions in meetings that are too large tend to be so brief and superficial that they have little value for evaluation or decision making.

The optimum size of a review meeting depends on review objectives, the know-how and ability of organizers, the facilities available, and the meeting's organization and dynamics.

For example, if the objective of a meeting is a thorough revision of a project's methods and results in relation to its objectives, it may be best to organize a small meeting with detailed presentations and sufficient time for discussions and field visits. On the other hand, another meeting may be organized at the program or research center level to improve communication and team work. In this case, the depth of discussions may be sacrificed to allow all team members to have the opportunity of presenting their work and learning about the work of others.

Reports. All internal reviews should produce a concise yet substantial report, highlighting the review objectives, the subjects treated, the review methods, and the conclusions and decisions arrived at. The object is to document the information exchanged to formalize decisions made and to facilitate the required follow-up. The report is also an instrument for communicating with other units and institutional levels, particularly if legal or administrative support is required.

The institution should establish a format for internal review reports, to enahance the institutional memory and to allow comparisions to be made over time.

Institutionalization. Internal reviews require a variety of resources, among them, scientists' and managers' time, meeting rooms, and office supplies. To guarantee the availability of these inputs, internal reviews should be backed by management and be considered as an integral part of institutional activities. Internal reviews must have continuity and periodicity depending on other institutional activities; i.e., budget and planning.

Summary. The objectives aimed at must be clearly established in preparing an internal review. The subjects to be covered, the documentation, and review mechanisms should be provided to participants. To guarantee an internal review's success, panel participants, especially of the meeting's co-ordinator, should be selected on the basis of

leadership skills and know-how. The meeting should be conducted in such a way that it allows ample and open discussion among all participants, but is focused on central subjects. The review should produce conclusions and decisions which are documented in a report and followed up on.

Use of Results

The conclusions and recommendations of an internal review must reflect themselves in decisions made in relation to planning, implementation, and evaluation of research activities. Therefore, utilization of the information generated and analyzed during an internal review depends on how this event is integrated into the research and institution's decision-making processes.

For the results to be used, internal reviews must be seen by both higher level managers and by scientists as an important source of information and a sound analysis mechanism. Also, they have to be designed and managed as an integral part of a PM&E system.

Ideally, all projects to be reviewed have been formulated with common norms and formats. Also, all research indicators and criteria for evaluating results should be previously established. Operational plans should be used as a point of reference in internal reviews at the research program level.

Information generated by an internal review should be presented in a such way that it can be incorporated into the institution's monitoring process. It must be an instrument of information for researchers and thus the event's co-ordinator is responsible for guaranteeing that everyone participates and that the report is distributed among all those interested.

What Makes a Good Internal Review?

As any institutional event in which resources are used, internal reviews should be evaluated. This evaluation should be conducted by participants, bearing in mind previously established criteria such as:

- organization and coordination.
- conformation of the evaluating group.
- conduction of the meetings.
- availability and timeliness of background information.
- quality of oral presentations.
- coverage of objectives and subjects proposed.
- conclusions drawn and decisions taken.
- utilization of results.

Project Databases

*A **project database** facilitates organized storing of information, to generate different types of reports with different combinations of variables.*

The concept of Management Information System was introduced and defined before, in Sequence 1 of this module. This section discussed the use of an information system at the project level as an instrument for agricultural research monitoring. This type of database is called a Project Database.

All agricultural research organizations have some type of filing system with information on projects or activities. These systems normally have sets of cards or paper files, with descriptions of on-going studies and progress reports. Today's tendency is to organize by project and use information systems employing computers and databases (Figure 12), which increases the number of variables that can be included, and eases storage, analysis and preparation of reports.

Figure 12 highlights the fact that a good project database does not necessarily have to have a computer; however, they are recommended in view of the low cost today and the growing availability of personal computer and commercial software.

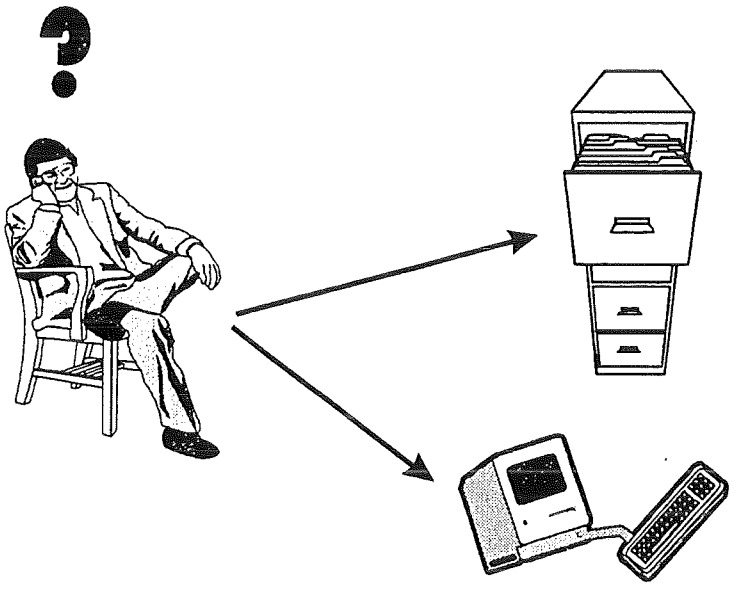


Figure 12. Types of project databases

Uses

Usefulness of Project Databases
- *Support decision making*
- *Filing of scientific information*
- *Production of reports*

The project database has several potential uses, but the most valuable is **supporting** decision making at different levels in the organization. A project database that contains information on on-going projects and programs, their costs, expected benefits, and results achieved to date, can be very helpful for making decisions in various areas, like the following:

- Planning and setting priorities
- Technical-scientific decisions on research
- Monitoring and evaluating projects, programs, and organizational units

Other uses are filing scientific information and producing reports of several types. Some of these are scientific, others are administrative.

Design and Operation

Certain requirements need to be met for designing and operating a project database. The main one is organizing research by projects. This may sound a little redundant. But it is important to note that in most cases, agricultural research is not organized by projects, but by activities under the responsibility of individual researchers, or by programs that rarely have clear definitions. Thus, a common prerequisite is defining the basic research unit as the "project".

The other prerequisite is institutional commitment at the director level. A project database not only requires resources, but also decisions on research organization, and the flow and use of information for decision making.

Designing the system

Designing a project database requires making decisions on the following points:

- Type of information to be generated.
- Degree of integration with accounting.
- Compatibility with other databases.
- Degree of decentralization.
- Technical design.

Type of information to be generated. The most important decisions in establishing a project database, as with a Management Information System, refer to the type of information and reports that the database must generate. This normally reduces the question to "What is it that you want to know?"

This decision is very important. Therefore, mistakes in answering this question, or never asking the question (!) frequently leads to the creation of databases which are of little use to managers and researchers and which are quickly abandoned.

Many projects databases are "underutilized". This may be because researchers and managers do not know how their information might be used. But more often it is because their design was inadequate, and they cannot provide timely and useful information.

In designing a project databse, it is important to begin with the types of information which are most frequently requested over time, and to leave special-request data for later.

Most agricultural research managers know what type of information is most often requested.

For example, relevant information for the Office of the Director General may include:

- Total budget by program and project.
- Use of human resources by program and project.
- Cost of research by program and project.
- Training activities.
- Inventory data..

In contrast, a scientist in charge of a Program, may want to know for each project:

- Current objectives.
- Schedule of activities for the year.
- Percent of budget spent to date.
- Results obtained to date.

A Center Director may require the same type of information as a Director General or program leader, but at the center level.

A project database needs to be design to satisfy these types of information requests. Additionally, recurrent information requests from external donors (government, producers, international agencies) need to be incorporated. This may imply, for example, having to separate budget information by financing source.

Degree of integration with accounting. Another critical aspect of a project database is the degree to which it is integrated with the institution's accounting systems.

Traditional financial and administrative systems often have accounting formats that are not compatible with the requirements of project

management. For example, a typical accounting report may include information on total expenditure on salaries in an institution, but cannot indicate the cost of a project or program.

The current tendency in research institutions is to introduce budgeting and accounting by project. This can be a source of conflict due to the partial delegation of power from the accounting administrator into the hands of project or program leaders.

Accounting systems do not have to be completely integrated with the project database. They can be independent systems, as long as they produce the desired information, aggregated on the same criteria used in the project database.

Compatibility with other databases. There are probably at least as many databases as institutions. It is impossible to design a database that is compatible with all others. But efforts should be made to make project databases compatible with other managament databases in the institution (e.g. with those for human resources and accounting) and with those of major funding sources and oversight functions (e.g. the ministry of planning).

Figure 13 shows the relationships of project databases to the different levels of information storage.

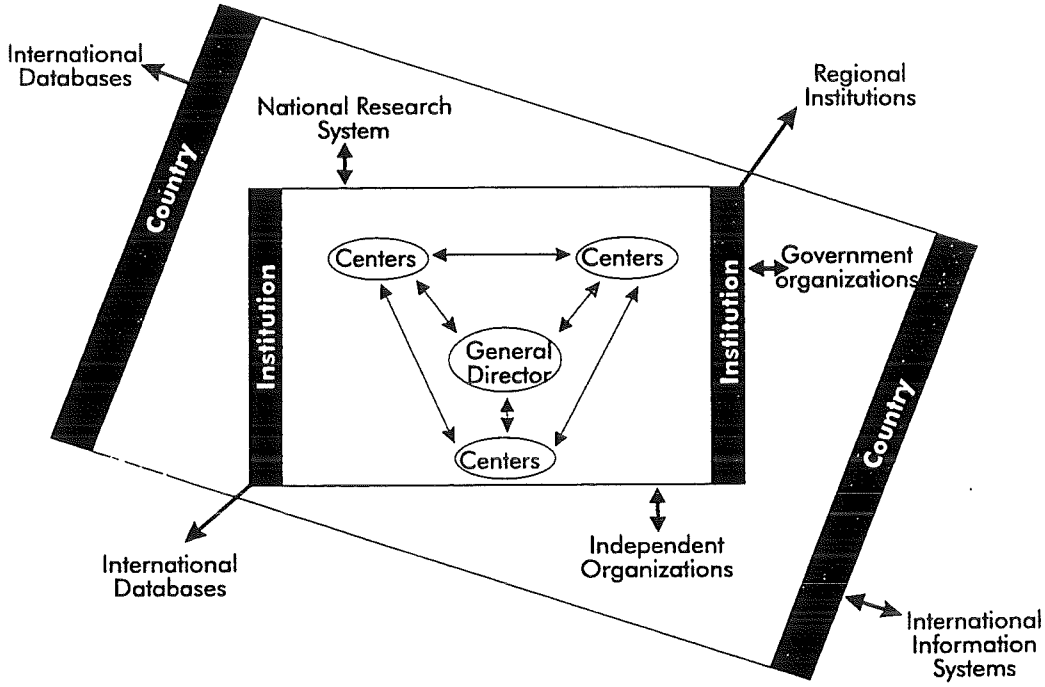


Figure 13. Relationship among project databases

Degree of decentralization. The ideal is a unified design with implementation decentralized. This is technically possible thanks to advances that enable communication among different units through network connections.

Sometimes top managers consider that the most important information is that which they need for decision making at their level. In such cases, researchers may view a project database as a control mechanism. This is bound to limit the value of that a project database for monitoring research activities.

Decentralization decisions must consider all the processes involved: data collection, storage, and processing and the production of reports. Some processes can be centralized, while others are decentralized, depending on the information and expertise available at each level.

For example, one alternative is to collect data at the regional level, storing and processing them at the central level. Another alternative is to delegate responsability for certain analytical processes to the regions and provide researchers access to certain information on their computers.

Technical design. Many options exist for the technical design of an information system at the project level. Decisions on design are important since their execution can imply large investments in hardware and software, in addition to personnel training. Once these investments have been made, it is difficult to change the system and its operation without discarding the initial investments.

Some institutions have made complex designs, covering a large number of variables to generate specific reports using mainframe computer. But after a few years, institutional needs changed and different reports were needed. Often they could not be produced because the software would not take these changes. Today the tendency is toward the use of personal computers and more flexible software, that permit more flexibility in data processing and the reports produced.

Critical decisions on design:

- *Information to be generated.*
- *Integration with accounting.*
- *Compatibility with other databases.*
- *Decentralization.*
- *Technical design.*

In another case, software selection has been made without considering the capacity of available computer equipment. When the capacity of the equipment or personnel is inadequate, data processing is slow and may not be possible to produce the required reports.

System operation

Operating a project database requires three basic activities:

- Collecting, entering, processing, and storing data
- Periodical updating of files
- Production of reports

Collecting, entering, processing, and storing data. These are the daily tasks of database operators. The validity and usefulness of the information stored in databases depends on the rigor and care with which these activities are conducted. Procedures for these activities must be included in designing the system. Also, the only way to assure high quality information is through the careful and rigorous administration of the project database operation in all its aspects.

Periodical updating of files. An important aspect in designing a project database, and one that has many implications for its operation, is the mechanism for updating files. With what frequency should new projects be added? Two extreme options would be annual updating, or daily updating. Another decision needs to be taken on the frequency and procedures for updating existing files.

Production of reports. The term "report" is used for two main products of project databases: routine reports (such as project lists and cost estimates of research conducted at different research centers and programs), and specialized reports produced on request for managers, scientists, and other users (such as donors).

Planning and producing reports that meet the requirements of different groups of users is very important in terms of their periodicity, content, and form.

Desirable Characteristics

A good project database provides the information required, in the format required, at the appropriate time, and at an acceptable cost. General criteria are effectiveness and efficiency.

Effectiveness involves producing the right information at the right time for decision making or other uses at each institutional level.

Efficiency involves delivering this information, at the lowest cost possible.

Institutional characteristics. For a project database to be effective and efficient, the project must be the basic unit in research management, both in technical-scientific terms as in administrative terms. A quick verification can be done by consulting a project leader and finding that he has updated information at hand that allows him to control project activities on time.

Characteristics of the database itself. The database must be **flexible** to allow entering additional information during project execution, as well as entering new projects. Access to information should **not be complex.** Existing information should be easy to manage and even a non-qualified user should be able to enter the information. This avoids the situation where only a few can have access to the information and makes decision making more transparent.

Characteristics of the data. The data must be **valid**, in other words, they must be reflect the actual activities of the institution. Data must be **relevant** to facilitate decision making, and must be **updated**, that is, correspond to a period of time that is relevant for decision making. Information that is available too late is of only historical value. Timeliness requires efficient information collection, storage and analysis.

Characteristics of the database operation. An efficient database outputs information quickly, even where several different variables need to be combined. Decision making often needs this speed and flexibility. Another desirable aspect is that database operation are affordable.

Characteristics of the database's outputs. Reports from the database are its final objective. Reports should be able to combine variables requested by users. Rigid databases that can only produce routine reports on a fixed schedule quickly become obsolete.

Experience indicates that the **cost of research is a key variable** which a project database should be able to provide. Many reports on resources are of little use if they do not include the cost figures.

A final point: One must never forget that the researcher is the key manager of his/her own projects and activities and he/she needs information to fulfill his/her management functions. Researchers also need feedback and encouragement. If they do not receive feedback information from the database, they will soon lose the incentive to provide the system with valid information.

An institution's project database should be flexible enough to satisfy changing monitoring and decision-making needs.

Table 11 summarizes a project databases' desirable characteristics.

Table 11. Desirable characteristics of a project database

Institutional characteristics	• Clear definition of objectives. • Organization of research by projects.
Design	• Flexible. • Simple.
Data	• Valid. • Relevant. • Updated.
Operation	• Timely flexibile. • Low cost.
Outputs	• Reports on request. • Useful for decision making. • Include cost estimates. • Feedback information to scientists.

Example

To illustrate the principles discussed above, an example is included on how a project database can be initiated in an institution, using commercial software for database management.

A central message of this sequence is that a monitoring instrument's usefulness depends on its relation to other instruments. In this case, preparation of research project proposals needs to be related to the project database. According to Sequence 2, the proposal should contain least the following types of information:

- Title
- Summary
- Individuals and units in charge
- Objectives
- Expected outputs
- Justifications and state of knowledge
- Methods to be employed
- Schedule of activities
- Required resources
- Methods and indicators for monitoring and evaluation

A central project database can be constructed with this information. The basic structure of the database could include the following:

- Program
- Project
- Unit in charge
- Researchers in charge
- Initiation date
- Date ended
- Estimated cost

Bi-annual listings could be generated from these data, with the following characteristics:

General information

Program	Project	Unit	Cost	Completion date

Information by researcher

Program	Project	Cost	Completion date

Information by program

Project	Unit	Researcher	Cost	Completion date

Table 12 shows a hypothetical case for this exercise

Table 12. Bi-annual listing of general information of a project database, based on project proposals

Program	Project	Unit	Cost US$	Completion date
Rice	Pest control	Entomology	20.000	March 96
Rice	Weed control	Agronomy	45.000	December 97
Beans	Pest control	Entomology	15.000	April 96
Beans	Regional trial	Agronomy	100.000	January 98
Cattle	Complement	Nutrition	56.000	August 96
Tech transfer	Fertilizer use	Agronomy	33.000	May 97
Economics	Competitiveness	Economics	10.000	June 98

If information were available on geographic location, for example, the basic structure of a project database could be broadened to generate a list by location, as follows:

Information by geographic unit

Program	Project	Cost	Completion date

It is important to find out who needs this information and what for in order to consider the additional cost of producing it vis-a-vis the benefits it would bring.

Exercise 3.1 Analysis of Progress Reports

Instructor's Guidelines

Objectives

- ✔ Identify three strong points and three weak points in progress reports as monitoring instruments, and propose alternative solutions.
- ✔ Elaborate a proposal to improve the design of forms for presenting progress reports.
- ✔ Design guides for a critical analysis of progress reports.

Required resources

- List of general criteria for critical analysis of progress reports
- Annual project or program reports brought by participants
- Annual reports of an institution, center, or experiment station brought by participants

Instructions

- Divide participants into four groups
- Explain objectives, dynamics, and time allowed for completing the exercise
- The four groups will identify three strong points and three weak points of reports as monitoring instruments, based on the report's contents
- Two groups will elaborate a proposal for improving the design of forms for presenting project progress reports. The other two will design a guide for making a critical analysis of the progress reports
- Distribute among participants the list of general criteria to evaluate the report and the general guide of components in a progress report
- During the plenary session, each group will have 10 minutes to present their results. As feedback, present monitoring formats used by INIA (Argentina)

Time suggested for this exercise

Individual work	20 minutes
Group work	10 minutes (per group)
Plenary	40 minutes
Feedback	10 minutes
	110 minutes

Exercise 3.1 Analysis of Progress Reports

Participants' Guidelines

Individual work	• Revise your institution's progress report. Use as a guideline the provided list of criteria for evaluating a progress report, and worksheet with a list of components of a progress report which were handed out to you (time - 20 minutes).
Group work: For members of groups 1 and 2	• Identify three strong points and three weak points in the progress reports, seen as monitoring instruments (time - 20 minutes). • Develop a proposal for improving the design of the general guide of components in a progress report, to allow the improvement of monitoring (time - 20 minutes).
Group work: For members of groups 3 and 4	• Identify three strong points and three weak points in the progress reports, seen as monitoring instruments (time - 20 minutes). • Develop a guide that enables making a critical analysis of the progress reports, based on the list of general criteria for evaluating a progress report (time - 20 minutes).
Presentation at plenary	• Each group will have 10 minutes to present its results. The instructor will make a 10-minute synthesis.

Exercise 3.1 Analysis of Progress Reports

List of Criteria for Evaluating a Progress Report

- **Format and organization**: adequate for the audience?
- **Periodicity**: appropriate?
- **Style**: in accordance with the audience?
- **Content**: relevant for the audience?

Exercise 3.1 Analysis of Progress Reports

Worksheet: Components of a Progress Report

Date: _____

Program: _____

Project: _____

Person in charge: _____

1. Current status with respect to schedule: _____

_____

Reasons _____

_____

2. Percentage of budget spent: _____

_____

Reasons: _____

_____

3. Actions to be carried out: _____

_____

_____

4. Modifications proposed for initial plan, budget, or schedule.

_____

_____

5. Use of results achieved to date _____

_____

_____

_____

Exercise 3.1 Analysis of Progress Reports

Feedback

INTA

MONITORING ON-GOING PROJECTS:

Title: _____

Identification | | | | | | | | | | | | | |

A. ROUTE SHEET

Are requirements included in the corresponding instruction unit met?	FORM INTA	01	03	04	05	06	07	08	09
		YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

Taken to subprogram :co-ordinator: Note: Date: / /

Taken to the regional center: Note: Date: / /

B. EVALUATION OF THE PLAN

1. End goal
   - Is still valid ..... YES NO
   - If NO, a new one has been defined (INTA Form 01) ..... YES NO
   - Why has it been modified?:

2. Objectives
   - Are still valid ..... YES NO
   - If NO, a new one has been redefined (INTA Form 01) ..... YES NO
   - Why have they been modified?

3. Risk
   - The degree of external risk is still valid: ..... YES NO
   - If NO, has it been modified? (INTA Form 01) ..... YES NO
   - Why has it been modified?:
   - The degree of internal risk is still valid: ..... YES NO
   - If NO, has it been modified? (INTA Form 01) ..... YES NO
   - Why has it been modified?

4. Activities and outputs
   - Degree of fulfillment of activities proposed for the previous year ..... % ----
   - Degree of fulfillment of outputs proposed for the previous year ..... % ----
   - Why were activities or outputs behind sechedule?
   - Can activities planned for the year be carried out? ..... YES NO
   - Activities planned can be carried out with the budget allocated ..... YES NO
   - Can outputs specified be obtained with the activities planned? ..... YES NO

5. Comment briefly on the following aspects of the unabridged report: methodology, discussion, and results of the agricultural cycle reported.

Area Co-ordinator Signature _____

Experiment Station Director Signature _____

Person in charge of the plan Leg. _____

Exercise 3.2 Panel on Internal Reviews

Instructor's Guidelines

Objective	✔ Analyze the use and effectiveness of internal reviews as monitoring instruments in some organizations.
Required resources	• Guide for evaluating an internal review
Instructions	• Identify three participants to make a brief (10 minutes) presentation on internal reviews in their institution and provide them with the "Guide for evaluating an internal review" • Chair the panel: - the three presentations (30 minutes) - questions and comments from the remaining participants (20 minutes) - summary (10 minutes)
Time suggested for this exercise	60 minutes

Exercise 3.2 Panel on Internal Reviews

Participants' Guidelines

- Rapporteur: present a critical, 10-minute analysis on the use and effectiveness of internal reviews in your organization, based on the "Guide for evaluating an internal review". Make suggestions to improve them.
- Non-rapporteur: compare with the Guide the presentations made by the rapporteurs and make comments, questions, or suggestions.

Exercise 3.2 Panel on Internal Reviews

Worksheet: Guide for Evaluation an Internal Review

Date: _____

Place: _____

Project/Program/Division: _____

	YES	NO
1. The following had been clearly established before the meeting:		
• Objectives of the review?	❑	❑
• Subjects to be covered during the meeting?	❑	❑
• Review criteria and mechanisms?	❑	❑
2. Background information delivered before the meeting was:		
• Timely?	❑	❑
• Relevant?	❑	❑
• Sufficient?	❑	❑
3. Make-up of the evaluating group was adequate in terms of:		
• Objectives?	❑	❑
• Subjects?	❑	❑
4. Was leadership by the chairperson and the co-ordinator adequate?	❑	❑
5. Were participants encouraged and allowed to participate?	❑	❑
6. Were oral presentations brief and clear?	❑	❑
7. Were conclusions and decisions suitable and sensible?	❑	❑
8. Was a summary report prepared for the meeting?	❑	❑
9. Were the facilities and logistics appropriate?	❑	❑

10. What recommendations would you make to improve the planning, development, and usefulness of future internal review meetings? _____

_____

Exercise 3.2 Panel on Internal Reviews

Technical Form: Internal Review Report

Date: _____
Place: _____
Length: _____
Program/project/division: _____

1. Evaluating group

	Name	Position	Prog./Proy./Div.
1.1	_____	_____	_____
1.2	_____	_____	_____
1.3	_____	_____	_____
1.4	_____	_____	_____

2. Objectives of the review

2.1 _____
2.2 _____
2.3 _____
2.4 _____

3. Subjects covered

3.1 _____
3.2 _____
3.3 _____
3.4 _____

4. Documentation distributed

4.1 _____
4.2 _____
4.3 _____
4.4 _____

5. Summary of the meeting _____

_____

_____

_____

6. Conclusions _____

_____

_____

_____

7. Decisions and recommendations _____

_____

_____

_____

8. Circulation _____

_____

_____

_____

Exercise 3.2 Panel on Internal Reviews

Feedback: Guide for Analyzing an Internal Review

Date: *18-08-93*
Place: *Montevideo*
Project/Program/Division: *Pastures*

	YES	NO
1. The following had been clearly established before the meeting:		
• Objectives of the review?	X	❑
• Subjects to be covered during the meeting?	X	❑
• Review criteria and mechanisms?	❑	❑
2. Background information delivered before the meeting was:		
• Timely?	❑	❑
• Relevant?	❑	X
• Sufficient?	❑	X
3. Make-up of the evaluating group was adequate in terms of:		
• Objectives?	X	❑
• Subjects?	X	❑
4. Was leadership by the chairperson and the co-ordinator adequate?	❑	X
5. Were participants encouraged and allowed to participate?	❑	X
6. Were oral presentations brief and clear?	❑	X
7. Were conclusions and decisions suitable and sensible?	❑	X
8. Was a summary report prepared for the meeting?	❑	X
9. Were the facilities and logistics appropriate?	X	❑

10. What recommendations would you make to improve the planning, development, and usefulness of future internal review meetings?
    - Shorter presentations.
    - Avoid interruptions.
    - Do not invite people who are not concerned with the project.
    - Make progress reports available to participants.
    - Prepare a final report.

Exercise 3.3 Case Study of a Project Database

Instructor's Guidelines

Objective

✔ Analyze, by means of a case study, the usefulness of a project database for monitoring, employing five types of criteria.

Required resources

- Copy for each participant of the case study of CENICAFE.
- An overhead transparency with instructor's conclusions (feedback).
- 10 clean overhead transparencies for the participants.
- Guide for analyzing the design and operation of the project database.

Instructions

- Request participants to divide themselves up into four groups.
- Give each group a copy of the document on the establishment of a project database (CENICAFE) and the guide for analyzing the design and operation of a project database (work sheet).
- After 20 minutes assigned for individual reading, request participants to analyze the case in the group, from the point of view of the five components defined, writing down your observations in a transparency (20 minutes). A member from each group will serve as rapporteur and will make comments on the usefulness for monitoring of the database analyzed (5 minutes).
- Set up a debate on the conclusions reached by participants. During the debate, ask key questions to focus discussion on relevant subjects (20 minutes).
- You must have at hand a transparency with your own conclusions on the basis of the criteria established, to be used as feedback information. These conclusions can be based on comments made by the persons in charge of the case study analyzed (5 minutes).
- Keep in mind that the components for analysis are the following:
  - institutional context.
  - design of the system.
  - data.
  - operation of the system.
  - reports produced.

Time suggested for this exercise	Individual reading of case study	20 minutes
	Group work	20 minutes
	Presentation at plenary	20 minutes
	Debate during plenary	20 minutes
	Instructor summary	10 minutes
		90 minutes

Exercise 3.3 Case Study of a Project Database

Participants' Guidelines

- Participants will read the case study provided by the instructor on an individual basis.
- After finishing reading, each group will analyze the case and the usefulness of the project database in the monitoring process described. Participants should arrive at a consensus of five main conclusions.
- Write the conclusions on a transparency.
- The analysis made will consider the five following groups of characteristics:
  - Institutional context.
  - System design.
  - Data.
  - Operation of the system.
  - Reports produced.

  See the guide for analyzing the design and operation of a project database (worksheet).

  For help in the analysis, participants would want to consider the following questions:
  - Do you think there is a clear conviction at all institutional levels in CENICAFE that the project database can operate as a real monitoring instrument?
  - Is the information included in the database relevant?
  - Does the database's design allow periodical updating of information?
  - Are operational costs adequate?
  - Do the information variables incorporated allow preparing reports that are useful for decision-making? At what institutional level are these reports useful?
- A member of the group will present conclusions during the plenary session.
- Participants will debate during the plenary session the case study analyzed and the conclusions of each work group. Try to refer always to the five groups of main characteristics.

Exercise 3.3 Case Study of a Project Database

Worksheet: Guide for Analyzing Design and Operation of a Project Database

5 General criteria: effectiveness and efficiency	Yes	No
Institutional characteristics		
• Clear definition of objectives for the database	❑	❑
• Organization of research by projects	❑	❑
Characteristics of the database		
• Flexibility: does it allow entering new projects and eliminating existing ones?	❑	❑
• Compatibility with other databases: can other project databases be directly accessed?	❑	❑
• Transparency: can relevant information be accessed?	❑	❑
• Simplicity: is it easy to understand and handle?	❑	❑
Characteristics of the data		
• Information included:		
- Characterization of initial problem	❑	❑
- Project objectives	❑	❑
- Resources required	❑	❑
- Methodology	❑	❑
- Activities to be conducted	❑	❑
- Expected results	❑	❑
• Information included is valid	❑	❑
• Data are up-dated	❑	❑
Characteristics of the database's operation		
• It is flexible and can provide the answers requested	❑	❑
• Operation is not expensive	❑	❑
Characteristics of the database's outputs		
• Reports are useful for decision making:		
- at the institutional level	❑	❑
- at the center level	❑	❑
- at the program level	❑	❑
- at the researcher level	❑	❑
• Many options to combine variables on request	❑	❑
• Includes economic evaluation of activities for each project	❑	❑
• Includes feedback for researchers	❑	❑
• Includes working time distribution of researchers by project	❑	❑

Exercise 3.3 Case Study of a Project Database

Case Study: CENICAFE[1]

Institutional context

The Colombian National Federation of Coffee Growers. The Colombian National Federation of Coffee Growers is a national association of coffee growers. The general objective of the Federation is promoting economic and social development of all coffee growing areas in Colombia. To fulfill this objective, the Federation conducts activities in several areas, such as coffee marketing, physical infrastructure (roads, electricity, etc.), agricultural research (on coffee and other crops grown in the coffee areas), education, and health.

The National Federation of Coffee Growers is financed through a tax on coffee exports and by its own income generated by several enterprises related to the coffee economy, such as insurance companies, transportation enterprises, databases, etc.

CENICAFE. The Federation's research activities started as soon as the Federation was established, in 1938. Financial resources for these activities have always been included in the Federation's budget. Agricultural research activities are conducted at the National Coffee Research Center (CENICAFE) with headquarters in the central station of Chinchiná-Caldas, one of the main coffee-growing region where all agricultural research is concentrated. Adaptive trials are conducted in other regional stations.

CENICAFE's mandate is to generate, adapt, and transfer scientific and technological know-how, in accordance with coffee growers' needs, in the areas of natural resources, production, harvesting, postharvest, and processing, with the object of guaranteeing production sustainability, increasing productivity, preserving and improving coffee's competitive potential and that of other products in the coffee growing region. CENICAFE's mandate does not include extension activities, which are taken care of by another team in the Federation.

[1] Based on Posada, R. 1994.

Starting in 1988, CENICAFE institutionalized a strategic planning process for research activities. Researchers actively participate in planning. The planning unit is the research project, proposed by a scientist. Demand from producers is expressed through direct contact with researchers, or indirectly through the Technical Directors of State Coffee Committees.

Monitoring is conducted in CENICAFE indirectly through the annual report, either written or verbal, presented by each researcher; and through internal seminars, publications, and extension and technology transfer activities. An internal information system is being developed to enable the monitoring of each project included in the project database. Evaluation in CENICAFE is also done indirectly, primarily by producers who receive, try out, and adopt the technologies suggested by researchers. On-farm trials are considered to be the main evaluation instrument.

PM&E Processes

Introduction. PM&E processes in CENICAFE fall into two periods. Before 1988, internal PM&E procedures were under the responsibility of program directors. During this period, these responsibilities included project reports, annual program meetings, and the institution's annual report of activities. The danger of pests and diseases in the coffee growing areas that could be brought in from other countries forced medium- and long-term planning. A specific case was the development of varieties and technological packages to counteract the impact of a disease known as coffee rust.

During the second period, starting in 1988, PM&E processes were institutionalized. All researchers participated actively in this change. The planning unit is the project, and responsibility for PM&E is in the hands of the project leader. Traditional mechanisms continue to be used (final project reports, annual reports, and institutional reports). Institutionalization of PM&E at the project level induced changes in the Center's administrative structure and created the need for developing a computerized information system.

Currently 300 persons work for CENICAFE; 132 of these hold a professional title (9 Ph.D., 32 M.Sc., 91 B.Sc.); 168 are support personnel and of these, 50 work in the administration area. Additionally, graduate and undergraduate students carry out their thesis research in on-going projects sponsored by CENICAFE. This latter system has allowed scientists to supervise a greater number of projects.

CENICAFE's budget for 1992 was US$ 5 million, all of which come from the Federation's own resources from an value-added tax on exports.

Quinquennial Research Plan 1989-1993. By mid-1988, CENICAFE's new Director General proposed to the Federation's Technical Vice-management that a Quinquennial Research plan be elaborated for the period 1989-1993. This plan would be elaborated with internal CENICAFE resources and all researchers would participate. No external support was requested.

The objective was to develop an integral research plan for growing coffee and other crops of interest for the coffee zone. This plan would help achieve CENICAFE's research and transfer objectives—which have been historically defined by the Federation.

One result of this Plan was to unify criteria for defining CENICAFE's planning levels, programs, scientific disciplines, projects and experiments.

As a consequence of the Quinquennial Plan, institutional and administrative changes were made in the research center. A Research Advisory Committee was established, with internal PM&E responsibilities. Two new units were consolidated: Basic Support and Administrative Support Units. Research was reorganized in four programs: Agronomy, Biology, Postharvest, and Animal Production. Each program has identified its disciplines. Regional trials were concentrated at the stations.

The Quinquennial Plan identified a total of 115 projects, of which 44 were on-going projects, and 46 were identified as having immediate priority. Recommendations were made to start the remaining projects identified over the following years.

The Quinquennial Plan identified the training and specialization needs of personnel working for the institution. Also identified was the need to contract new personnel; the plan identified the number required and the specialization they should have. A direct product of the Quinquennial plan was the experiment database, as an instrument for the approval and funding by the Research Advisory Committee of any activity to be conducted.

The Quinquennial plan was later used to elaborate CENICAFE's budget.

Operational planning and budget. The research project is the subject of operational and budget planning yearly conducted in CENICAFE. The 1988-1993 Quinquennial Plan prepared a list of research projects interesting to CENICAFE. This list is the basis on which each researcher annually plans his work, either by continuing on-going projects or by initiating new ones.

Once the project has been identified and approved by the economics and biometrics support units, it is registered in the project database. The database records data for variables such as objectives and expected results; dates for project start-up and end; chronogram of activities to be conducted; land, inputs, and labor requirements; and participating disciplines and their responsibilities.

Projects registered in the database are submitted to the Research Advisory Committee for approval, rejection, or postponement, depending on priority research needs and availability of resources for research. If the project is approved, the project leader—with the help of the administration—prepares a detailed budget of each of its activities. The sum of individual project budgets makes up CENICAFE's total budget, which is submitted by the Director General to the Federations Technical Vice-management. This in turn is included as part of the Federation's budget and is annually approved by the National Coffee Congress.

Based on the requirements of approved projects, management schedules the contracting of field labor and the purchasing of inputs, and the experiment stations plans for use of land and machinery.

Even though the Quinquennial Plan's list of projects is the principal base for annual operational and budget planning, the system has enough flexibility to include other projects either on request from researchers, or due to emergency problems influencing on the coffee economy, or on request by the Technical Directors of the State Committees.

Operational and budget annual plans are synchronized to comply with internal requirements established by the Federation, such as presentation date and format.

The second Quinquennial Plan (1993-1998) was conducted on the basis of this organization; the procedure was similar to the one followed for the previous plan but managers considered that the stages were more easily completed this time. An **"institutional culture"**, aware of planning, was evident. This means that internal motivation is present and that the usefulness of this type of exercise has been recognized.

Information systems. CENICAFE can be considered as a small individual agricultural research institution. It could be compared to a product program in a national research center, something like the case of rice in ICA, Colombia. However, as a case study, CENICAFE illustrates the need to develop its own computerized system, independent from that of the Federation. This system would enable detailed monitoring of research activities identified in the Quinquennial Plan and operated by the Research Advisory Committee.

The idea of this system goes beyond a project and/or experiment database. The interdisciplinary strategy or strategy by matrixes requires control of the time spent by researchers, the sequence of experiments, the optimum use of resources (such as land), the supply of inputs (such as labor), the fulfillment of the chronogram, etc.

In the case of CENICAFE, the information system has had to be designed for the specific characteristics of a perennial crop, the type of research conducted (from germplasm databases to industrial processing), the institutional requirements of the National Federation of Coffee grower budget presentation), and the managerial requirements of the Office of the Director and the Research Advisory Committee.

Responsibility for developing an information system is in the hands of a support unit, internally denominated **"Systems"**. Two types of audiences are expected. On one hand, administration, which would use the system to program its purchasing activities and supply of equipment, machinery, labor, etc.; and on the other hand, researchers who would use the system to control and monitor their activities. Five professionals are in charge of developing this system. The process is underway. The system's basic structure was developed by a thesis student financed by the institution.

CENICAFE's experience shows that systems support is an indispensable requirement for guaranteeing the implementation and monitoring of a research plan. Additionally, it shows that this support has to be developed internally in the institution.

Conclusions

CENICAFE's experience in PM&E acquires great importance with the rise of small, private research centers, organized around a commercial crop. A reasonable strategy, within the framework of ISNAR's project, would be to enhance diffusion of this case.

CENICAFE's experience could also be applied by national institutions to research by products at the national level. The greatest contribution would be the creation of standards of concepts related to identifying and organizing projects and activities that facilitate the different stages of PM&E. The strategy suggested is to document the way to arrive at these type of definitions for each product.

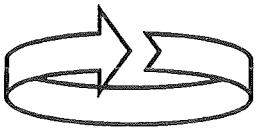
Monitoring of a great number of research activities planned by different decision-making units, and the programming of support activities, such as transportation, purchases, contracts, etc., require that internal information and communication systems have a large installed capacity. CENICAFE is in the process of developing a centralized information and administration system. This is an area in which the institution could receive an external

input, since, at first sight, goals may overflow internal capacity for perfecting and starting a system with the desired characteristics.

Another useful experience work repeating is the adaptation of an administrative system oriented toward increasing the efficiency of research support services. Once CENICAFE has developed its information system, sufficient know-how will be available on strategies adopted, size, and operation of the system.

Exercise 3.3 Case Study of a Project Database

Feedback



An example of how to conduct this exercise could be the following:

Institutional context: is adequate for operation of a project database, since the decision to create it came from management and was backed by researchers.

System design: is very complicated includes too many variables for which data are not always available.

Data: periodical updating is difficult due to the system's design.

Operation of the system: responsibilities in each operation sequence are well defined.

Production of reports: the design includes the preparation of several types of reports by combining several variables at the same time; this is useful at several institutional levels.

Final conclusion: This database is in the process of being developed and intends to store a large amount of information and variables. Care must be taken that its design does not go beyond the limits of complexity, where the most relevant data could not be managed quickly and economically.

Summary

Progress reports, internal reviews, and project databases have been discussed in this sequence, as instruments for monitoring agricultural research. These instruments are frequently used to supervise programs and projects, in order to provide relevant and timely information to different management levels in agricultural research organizations.

Progress reports are mechanisms that put information on work in progress in an appropriate format for specific audiences. Progress reports are important inputs for internal review meetings. Several aspects of format and content must be taken into consideration when preparing reports. The most appropriate style, frequency and content depend on the audience to which they are addressed. Different decision-making levels in an agricultural research institution have different needs. Progress reports should be prepared which are based on the needs of potential users. The timeliness and frequency of these reports should always be considered.

Internal reviews help establish direct relationships and dialogue among researchers, administrators, and program directors in an institution. This is done by organizing meetings where an agenda is developed covering the institution's activities and programs. Project or program achievements and findings are presented during the meeting, as well as problems found during the execution of activities, and possible solutions. An internal review should generate a report to transmit information to different management levels and to provide a basis for re-evaluating priorities and planning future actions.

Project databases are relatively new monitoring instruments. They are managerial information systems at the project level.

The basic monitoring unit in a project database is the project and the information generated by the information system relates to this project.

This section presents the mechanics of a project database, as well as its usefulness in terms of helping decision making and as a reservoir of scientific information. Also introduced are requirements, for designing and operating a project database. Characteristics of the system itself are presented at a more detailed level, including: the effectiveness and efficiency of a project database, components (i.e., data), characteristics, and the products it generates.

In agricultural research, one should not attempt use a single instrument for monitoring. A whole range of instruments are available which can be used according to institutional, program, or project needs. The ideal combination of methods or instruments is the one that best satisfies information needs in a research organization, and at the same time allows this information to flow to all levels: not only to the directors who make decisions on policies, but also to the researchers who conduct research activities.

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

Instructor's Guidelines

Objective

✔ Propose improvements to a monitoring system in an agricultural research organization, based on the know-how and abilities acquired in the module.

Required resources

- Instructions for the "client"
- Written information and documents on the monitoring process in the institutions where participants come from. This information must be provided by them, and the central problem clearly identified.
- Terms of reference of consultation.
- Guide for preparing a proposal.
- Overhead transparencies for participants.
- One transparency with the guide for preparing a proposal.

Instructions

- Before carrying out the exercise (if possible, before the course) select five "clients" who have information on the monitoring system used in their respective institutions. Ideally, this information should be available in writing.
- Explain the objective and procedures of the exercise, reading out the objective and showing the guide for carrying out the proposal.
- Divide participants in work groups with no more than five persons each.
- Ask the remaining participants to act as "consultants"; their objective will coincide with this exercise's objective.
- Once in the work group, ask the client to describe the problems in his institution's monitoring system, based on the information he has available. Time required: 30 minutes.
- Distribute among participants (consultants) a copy of the guide for preparing a proposal.
- Explain that clients can remain next to consultants while the proposal is prepared, to answer any questions they may have.
- Announce the amount of time available for preparing the proposal: 40 minutes.

- After finishing the exercise, each group presents its proposal, using a transparency. In each case, the panel presentation is done by the consultants and the client. Proposal narrative will follow the guide.
- Each group will have 10 minutes for the presentation and 5 minutes for questions
- Chair the final debate on the content of proposals. During the development of the debate, motivate other groups to establish differences among proposals.

Time suggested for this exercise

Client's presentation	30 minutes
Proposal preparation	40 minutes
Plenary	60 minutes
Feedback	10 minutes
	140 minutes

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

Participants' Guidelines

- Divide in to groups of no more than five persons.
- The instructor will have previously assigned the role of "client" to one of the members of the group. Remaining participants will be called "consultants".
- Carefully read instructions corresponding to each role (client/ consultant).
- Having finished consultation tasks (70 minutes) indicated in the instructions, a plenary session is organized for groups to present their proposal.
- Time allowed for presenting the proposal and answering questions in the plenary session will be 15 minutes.
- Once all groups have finished their presentation, discuss existing similarities and differences among proposals presented (10 minutes).

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

Clients' Guidelines

- In 30 minutes:
  - Give consultants the terms of reference that the instructor will provide.
  - Describe your institution's monitoring system, using all the documentation available to you.
  - Clearly identify the central problem.
  - Allow time for explanations and questions.
- Remain with the group and cooperate with the work by answering whatever questions may arise.
- Briefly discuss with consultants the contents of the prepared proposal.

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

Consultants' Guidelines

- Carefully read terms of reference of the consultation provided by the instructor.
- Ask the client to describe in no more than 30 minutes the monitoring system in his institution and to answer questions to clear up doubts.
- Using the guide provided by the instructor, prepare a proposal for strengthening the monitoring system in the client's organization.
- The client will remain with the group to provide additional information.
- Time available for preparing the proposal: 40 minutes.
- Copy on a transparency the main points in the proposal for presenting during the plenary session.

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

Terms of Reference

Title of Consultation: Strengthening the monitoring process in an agricultural research organization.

Objective: At the end of the consultation period, consultants will make a proposal (on the guide format provided) for strengthening the process of agricultural research monitoring in the client's organization.

Expected result of consultation: A proposal for strengthening the monitoring system, covering the following topics (See attached worksheet):

- A diagnosis of the central problem and its causes, and of at least two other problems that need to be solved.
- A general description of the proposal to be executed for solving the problem.
- The strategy for executing the proposal.
- The proposal's main assumptions.
- The specific activities that must be carried out, in chronological order, in order to execute the proposal.
- The institutional level of those responsible for executing each activity (Board of Directors, Director General, Center Director, Program Head, Project Leader, Researcher).

Consultant's qualifications: The consultant must hold a professional title and have working experience in agricultural research organizations, especially in the area of institutional development.

Consultant's responsibilities:

- Interview the client, who will act as the counterpart, to obtain information on his organization's monitoring process.
- Make a diagnosis of the current state of this process, identifying the central problem.
- Prepare a proposal for strengthening the monitoring process by solving the problem identified. The person responsible for executing the proposal and the corresponding institutional level should be identified.

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

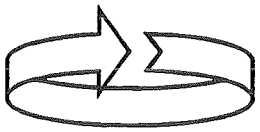
Worksheet: Guide for Proposal Preparation

Each group of consultants should prepare a proposal for strengthening the monitoring system in the client's organization the following headings are suggested for the proposal:

- Title of the proposal:
- Institution/country:
- Names of consultants:
- Diagnosis of the current problem:
- Proposal summary:
- Execution strategy:
- Main assumptions of this strategy:
- Main activities:
- Responsabilities:

Final Exercise — Preparation of a Proposal for Strengthening a Monitoring System

Feedback



Feedback should be based on the proposals prepared by each group. The following subjects should be analyzed and discussed:

- Depth and quality of the current situation's diagnosis, particularly if the cause-effect relationships are made explicit, i.e., monitoring of projects is deficient due to lack of periodical information.
- Do the proposals and strategies have a direct relation to solving the problems identified in the diagnosis of the current situation?
- Are the activities proposed complementary to the resources requested?
- Discuss the efficiency of the monitoring indicators proposed in terms of their relation to strengthening the process as a whole; i.e., progress reports are prepared but distribution is not adequate.

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

Participant Guidelines

The following are a series of questions related to different aspects studied in this module. The test will not be graded by the instructor. You will review your answers yourself; this will allow you to know the degree to which you accomplished the objectives established and to estimate what you personally have learned from the course.

Time: 30 minutes

Date: _____

1. What degree of coverage does the monitoring system have in your institution? Explain your answer _____

   _____

   _____

2. Analyze critically the effectiveness of your institution's monitoring system _____

   _____

   _____

3. What elements should a project statement include to facilitate monitoring and evaluation of the project? _____

   _____

   _____

4. Given the following characterization of a problem, the objectives formulated for the project and the inputs foreseen for its execution, propose indicators and means of verification for each level of objectives; i.e., for the inputs mentioned.

Breeding for resistance to all strains of bean anthracnose in Rwanda

Proposed by Gasana Gaspard-Bean breeding

The problem: Bean anthracnose, caused by *Colletotrichum lindemuthianum* is broadly disseminated in the main production areas in the highlands where existing climatic conditions favor the development of this disease.

Most varieties (and native species) cultivated by small farmers, who are the main bean producers in Rwanda, are not resistant to anthracnose. Even though varietal mixtures offer protection against epidemics, the crop is susceptible to the disease.

Fungicide control is effective. However, continuous use of fungicides can induce development of resistant biotypes. Fungicides are expensive and require special equipment like motor sprayers, which are limited among small farmers. Cultural practices such as the use of pathogen-free seed, crop rotation every two or three years, removal of sick plants during weeding or after harvest can help the farmers. Nonetheless, most of them cannot carry out these practices efficiently.

The use of anthracnose-resistant cultivars is the most practical and appropriate for bean farmers in Rwanda. The objective is incorporating resistance to varieties that are going to be diffused among farmers and thus improve the varietal mixtures they use.

Structured summary (partial)

Narrative summary	Verifiable indicators	Means of verification
Goal • Increase bean yields among farmers by planting improved, anthracnose-resistant varieties.		
Purpose • Improved resistant varieties identified for trials in farmers' fields.		
Outputs • Advanced lines from selected, anthracnose-resistant materials		
Inputs • Personnel and resources available (amounts and time)		

5. What would you propose to improve progress reports, internal reviews, or project datadases in your institution? _____

_____

_____

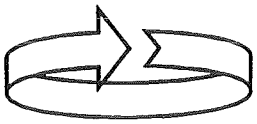
6. If you were to introduce changes in your institution's monitoring system, which would you consider the three priority changes and why? _____

_____

_____

Appendix 3 Feedback for Posttest

Instructor Guidelines



After time for the posttest is over, do the following:

- Present the possible answers.
- Allow participants to compare their answers with those of other participants.
- Comment briefly on the answers.

The following elements which relate to the questions will help to determine whether the answers are within the context of what was asked.

1. An integrated monitoring system generates systematic information on the context, inputs, products, and processes that are useful for decision making. More specifically, monitoring involves collecting information for preparing different types of reports and internal reviews that generate information for subsequent evaluations.
2. The effectiveness of a monitoring system can be judged on the basis of the usefulness of the information generated for decision making at different levels, and for preparing reports and evaluations. Ideally, the process should be decentralized and as simple as possible, to avoid excessive paperwork and the use of expensive and sophisticated instruments.
3. In order to facilitate monitoring, a project statament should include the following elements:
   - Synthesis of initial status, expected results, purposes, and clearly defined objectives.
   - Objectives according to the different levels: goal, purpose, and outputs.
   - The major assumptions behind the project's strategy and logic.
   - Strategies for achieving project objective.
   - Indicators on the basis of which research progress can be supervised and evaluated.
   - Means of verification for each level of objective: type of data required, information sources, collection techniques, and data analysis

4. Structrured summary

Narrative summary	Verifiable indicators	Means of verification
Goal		
• Increase bean yields among farmers by planting improved, anthracnose-resistant varieties.	Increase the proportion of new resistant varieties in varietal mixtures used by farmers	Survey among farmers
Purpose		
• Improved resistant varieties identified for trials in farmers' fields	Five improved varieties are proposed for on-farm trials conducted by each farmer	Extension reports
	Increase production up to 900 kg/ha	Production statistics
Outputs		
• Advanced lines from selected, anthracnose-resistant materials	80% of advanced lines show ample resistance to anthracnose	Annual research reports Regional bean program report
Inputs		
• Personnel and resources available (amounts and time)	One bean breeder. One technician (agronomist). Bean varieties (parents and sources of genetic variability) Equipment. Funds and infrastructure	Administrative and financial reports

5. Progress reports can be improved following these criteria:
   - Define audience clearly.
   - Design formats that allow relevant information to be reported in a simple and clear way, and by type of audience.
   - Select an appropriate periodicity for the type of audience.
   - Establish groups to review the report's consistency.
   - Establish feedback mechanisms: technical, political, or administrative in nature.
   - Initiate training for writing scientific reports.
   - Select appropriate dissemination.

Among the mechanisms for improving the effectiveness of internal reviews are:

- Define the review's objectives.
- Establish review methods and criteria by objectives.
- Establish appropriate periodicity by objectives and level (more frequent for lower levels, and less frequent for higher levels).
- Establish that all reviews must generate a report.
- Review report formats that enable conclusions to be reached, and which are of use in planning and evaluation.
- Establish feedback for scientists.
- Choose capable and competent participants.
- Identify leaders who can develop critical points.
- Set up an agenda which reflects objectives.
- Organize efficient co-ordination and conduct of meeting.
- Make sure paraticipation is brief and to the point.
- Institutionalize and formalize meetings.
- Establish appropriate balance between future planning and review of past activities.

6. Improvements proposed by participants to the monitoring systems in their institutions can be evaluated on the basis of the following usefulness criteria:
   - Will they contribute to the integration of PM&E activities?
   - Will they enable the development and application of instruments for the monitoring process in your organization so that they will enhance the flow of information among the different management levels and among research programs and projects?
   - Would they help to develop and apply simple and effective instruments for conducting monitoring in your institution? Would they provide information for prompt decision making in accordance with the diverse needs of different audiences?

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.

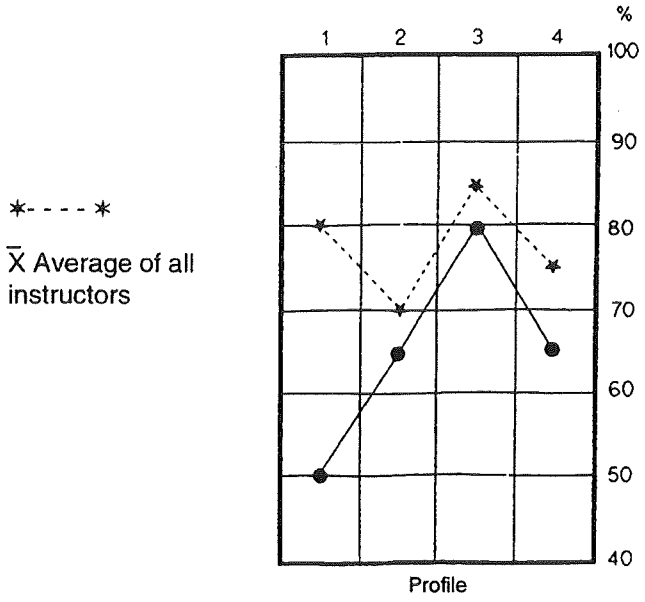
To calculate a score, follow this procedure:

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-14). 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.

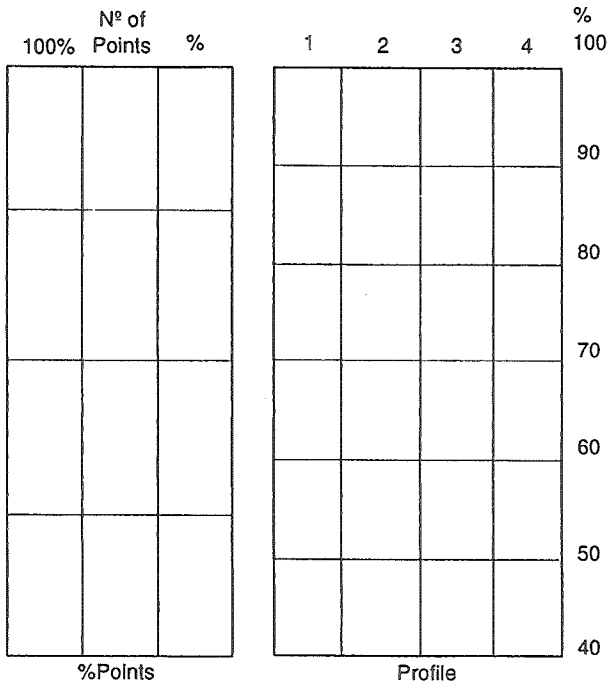
Evaluating Instructors*

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.

Module 3

Evaluation Criteria

Activity, material and/or content	1. 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		
	0	1	2	3	0	1	2	3	Little	Adequate	Too much	Little	Adequate	Too much
• Introduction to the module														
• Sequence 1														
- Monitoring in the region														
- Conceptual framework														
- Design and implementation of a monitoring system														
- Exercise 1.1: Scope analysis														
• Exercise 1.2: Analysis of effectiveness														
• Sequence 2														
- The project as a management instrument														
• The logical framework														
• Exercise 2.1: Analysis of a project														
• Sequence 3														
- Progress reports														
- Internal reviews														
- Project databases														
- Exercise 3.1: Analysis of progress reports														
• Exercise 3.2: Panel on internal reviews														
• Exercise 3.3: Case study of a project databases														
• Final exercise: Proposal preparation for strengthening a monitoring system														
• 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.

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Appendix 10 Overhead Transparencies

Cover

MONI-A Flowchart for Module 3.
MONI-B Terminal objective.
MONI-C Monitoring: CIPP approach.

Sequence 1

MONI-1 Flowchart for Sequence 1.
MONI-2 Monitoring in Latin America.
MONI-3 Components of a monitoring system.
MONI-4 Groups interested in monitoring information.
MONI-5 Key monitoring questions.

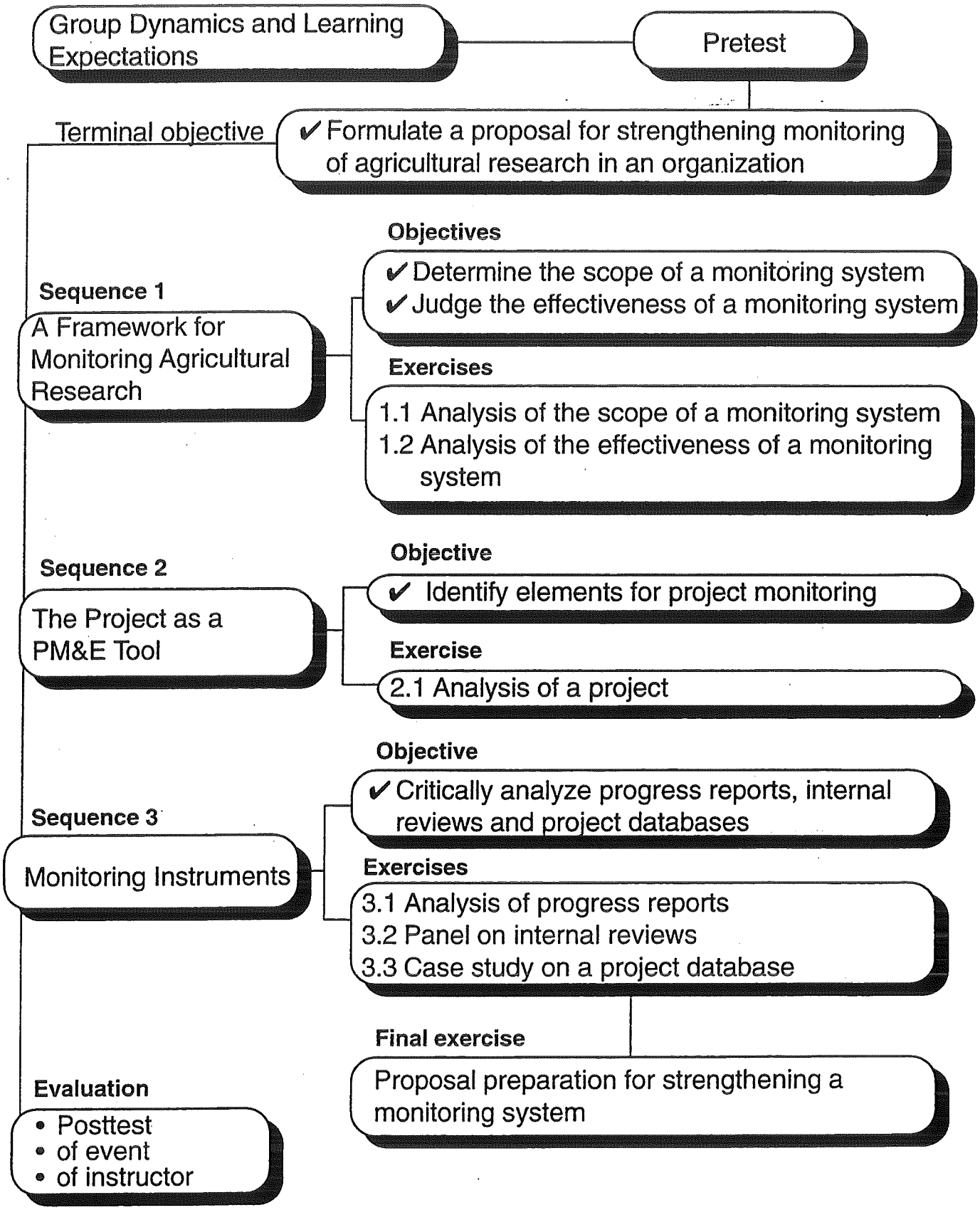
Sequence 2

MONI-6 Flowchart for Sequence 2.
MONI-7 Project cycle.
MONI-8 What is a logical framework?.
MONI-9 Logical framework matrix.
MONI-10 Vertical logic of the matrix.

Sequence 3

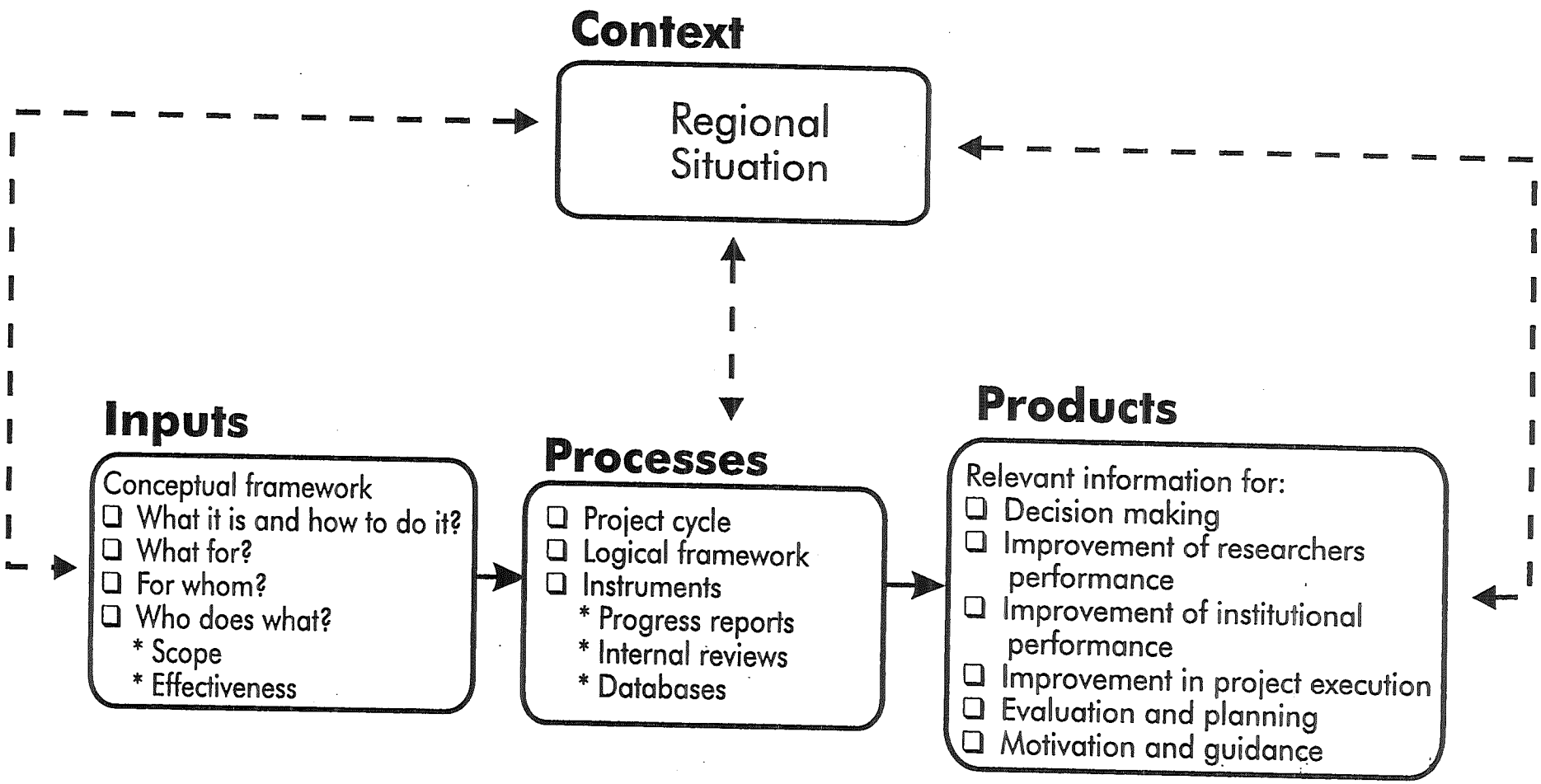
MONI-11 Flowchart for Sequence 3.
MONI-12 Monitoring instruments.
MONI-13 Objectives of internal reviews.
MONI-14 Preparation of progress reports.
MONI-15 Contents of a progress report.
MONI-16 Characteristics of a project database.

Flowchart of the Module



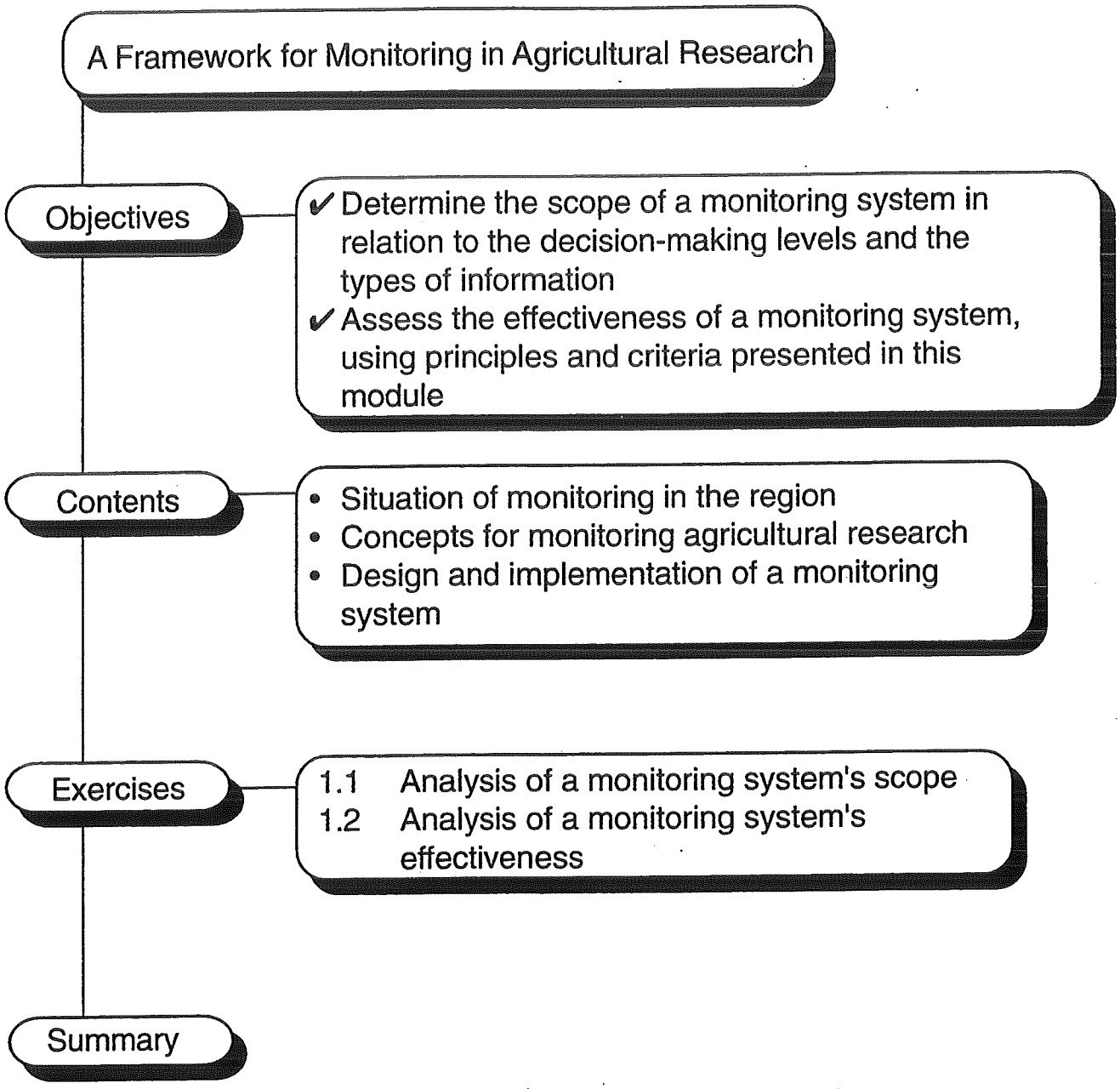
Terminal Objective

Formulate a proposal for strenghtening monitoring in your organization, using knowledge on monitoring methods and strategies presented in this module



Monitoring: CIPP approach

Flowchart for Sequence 1

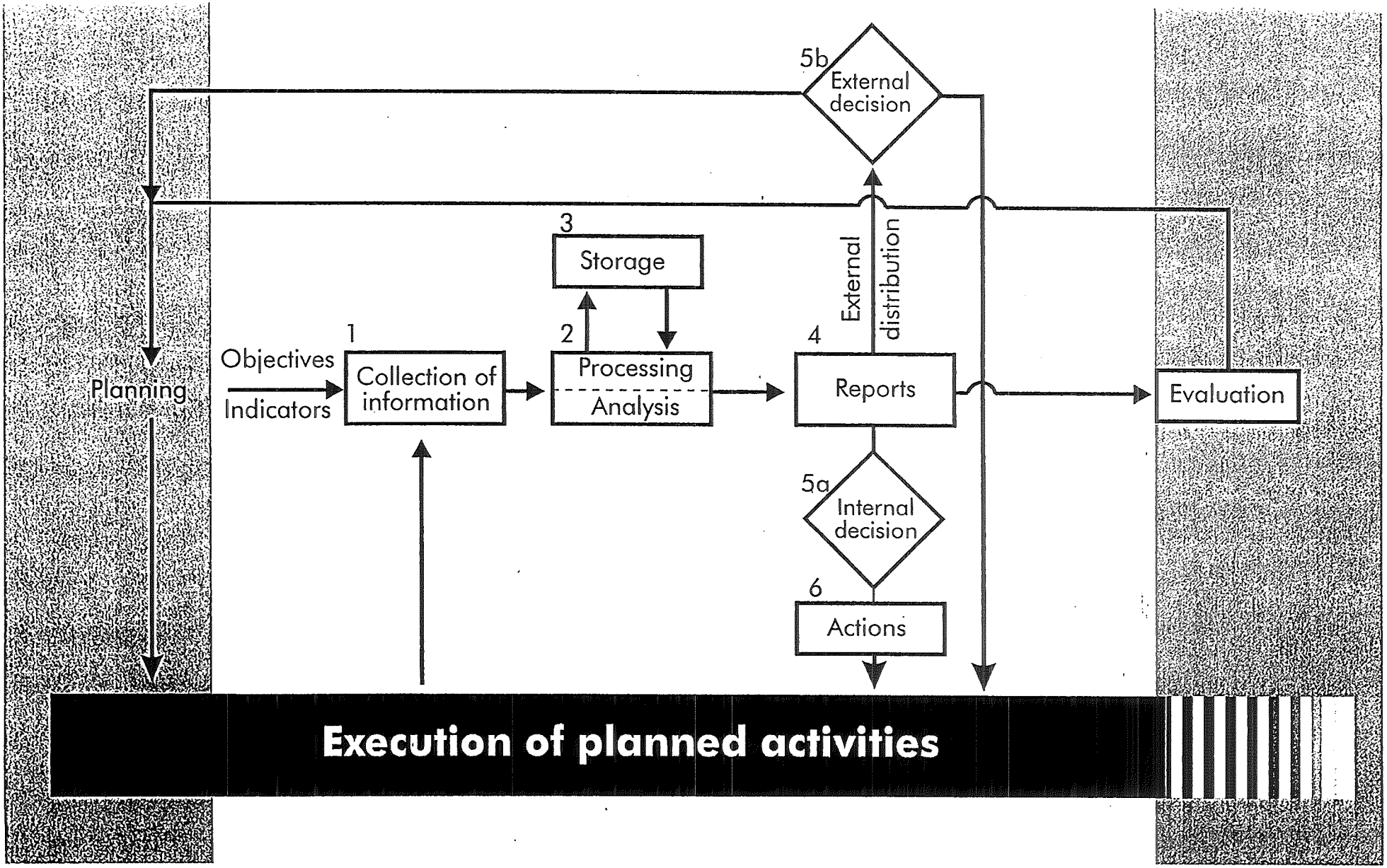


Monitoring in Latin America

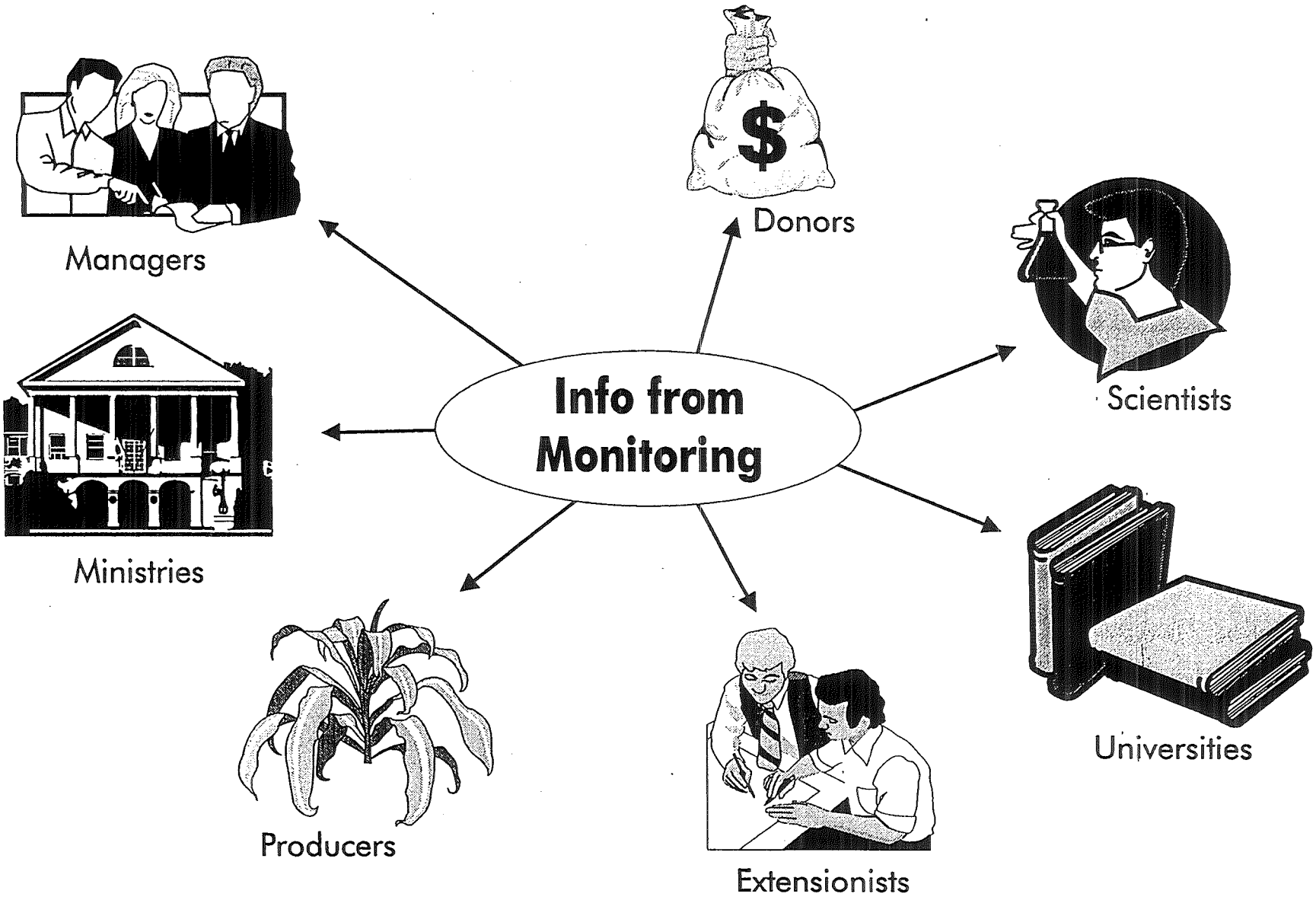
Instruments:

Researcher level	- Field visits - Progress reports
Center level	- Field visits in group - Budget reports
Program or project level	- Internal reviews - Progress reports
Institute level	- Project banks - Meetings of directors - Annual reports - External reviews

Components of a monitoring system



Groups interested in monitoring information



Key Monitoring Questions

* What is monitoring?

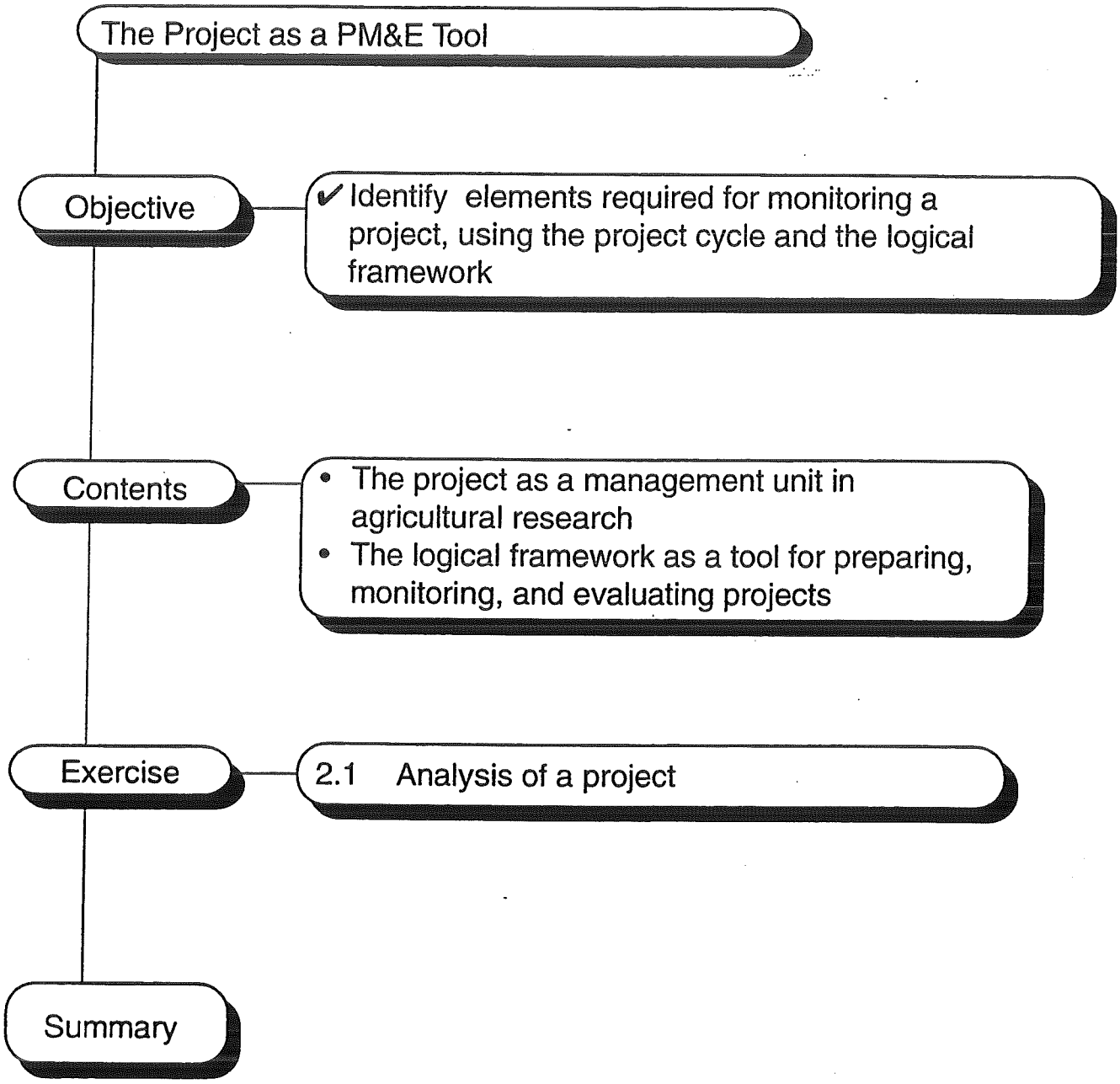
* Why should monitoring be done? (Objectives)

* For whom?

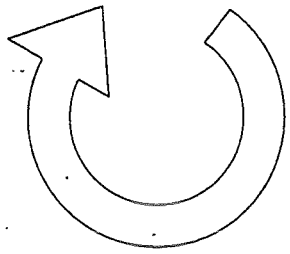
* What information should be collected, processed and recorded?

* How should the information circulate?

Flowchart for Sequence 2



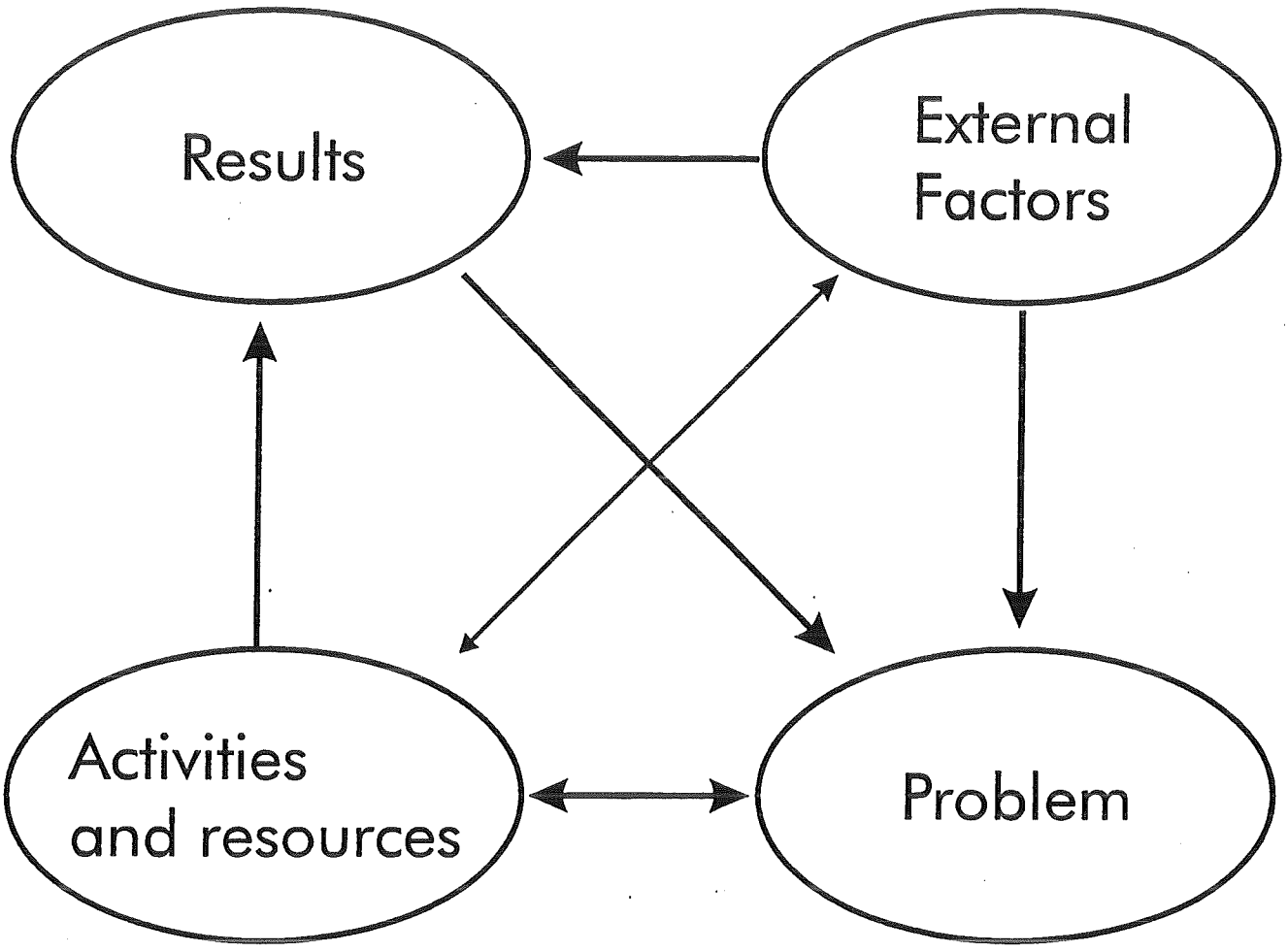
Project Cycle



Stage	Monitoring
1. Problem Identification	Participation of users
2. Proposal preparation	Program peers/colleagues
3. Proposal revision	External peers/colleagues/ users
4. Approval and allocation of resources	Institutional, Budget, Planning
5. Implementation	Project/Program leaders
6. Evaluation	Institutional Users Peers/Colleagues

What is a Logical Framework?

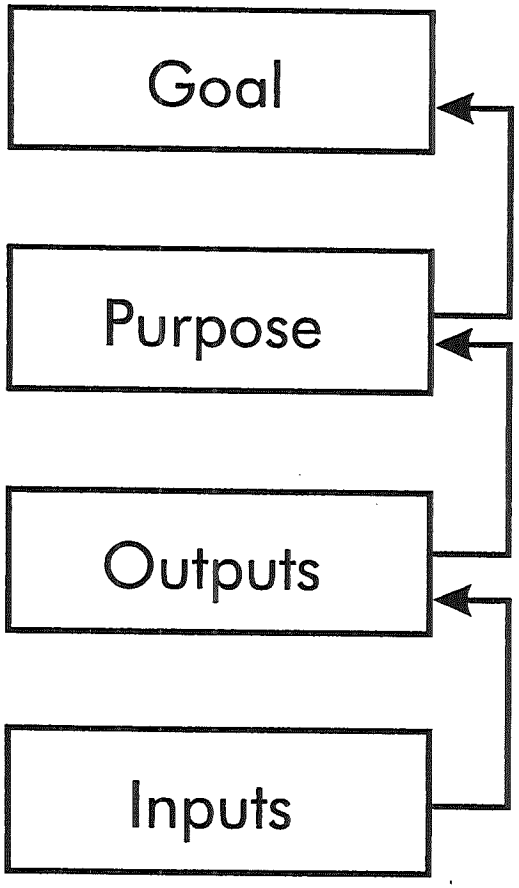
Presents the structure and main elements of a project, establishing relations among:



Logical Framework Matrix

Narrative summary	Verifiable indicators	Means of verification	Main Assumptions
Goal			
Purpose:	Final situation		
Outputs:			
Inputs:			Initial situation

Vertical logic of the matrix

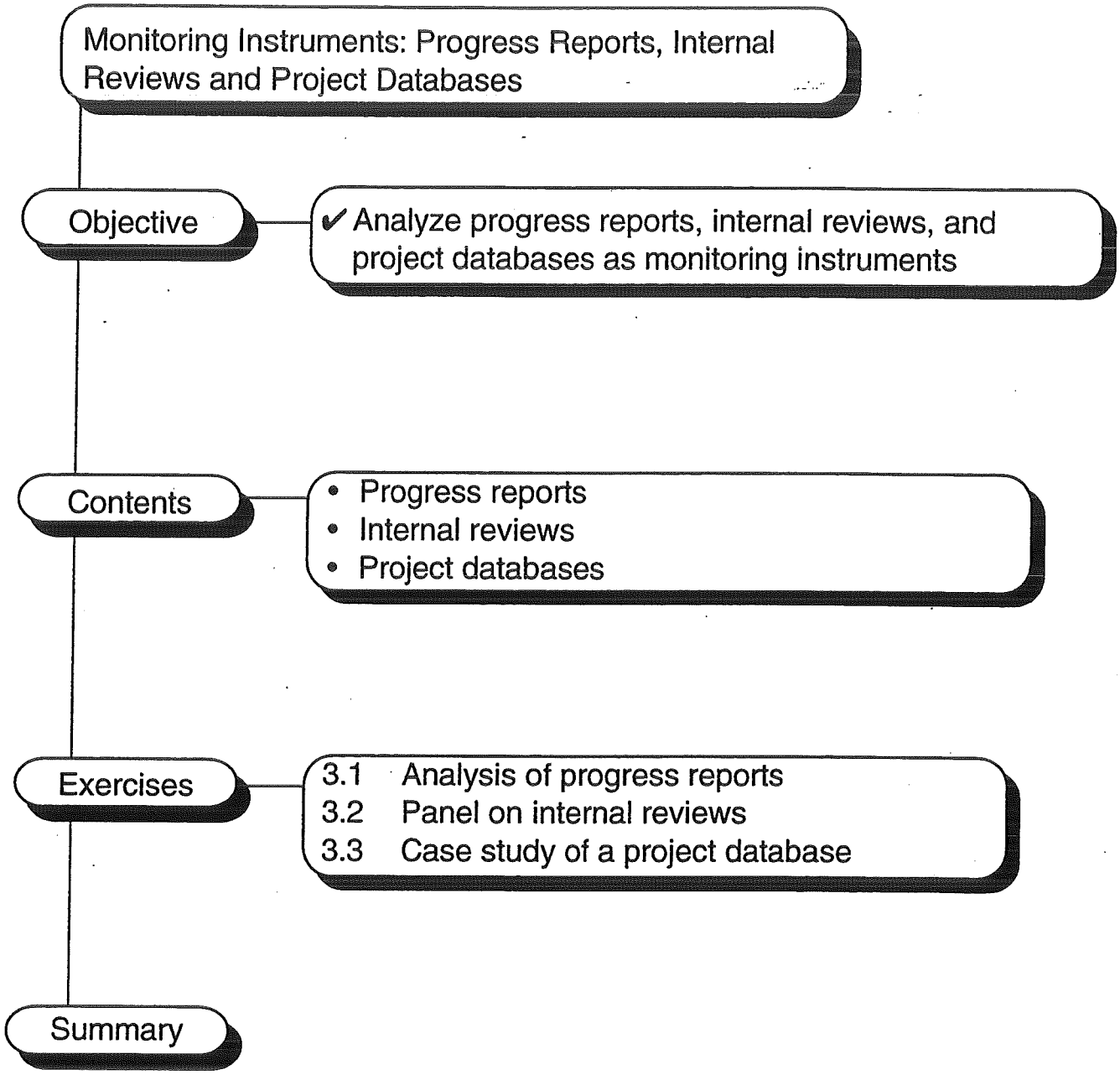


If purpose: then goal

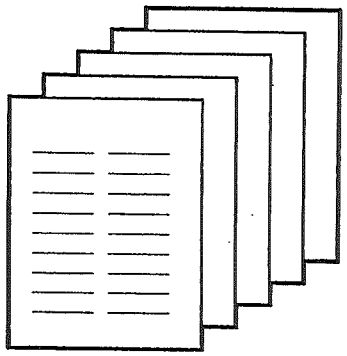
If outputs: then purpose

If inputs: then outputs

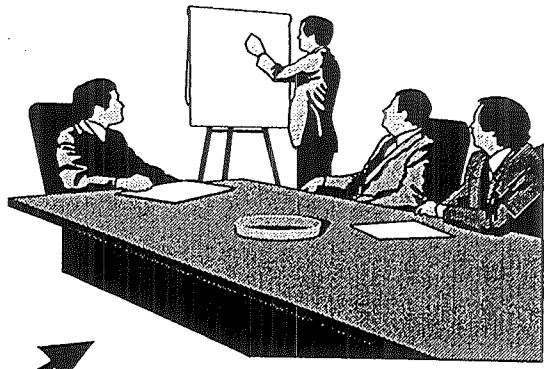
Flowchart for Sequence 3



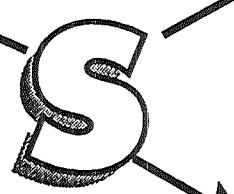
Monitoring instruments

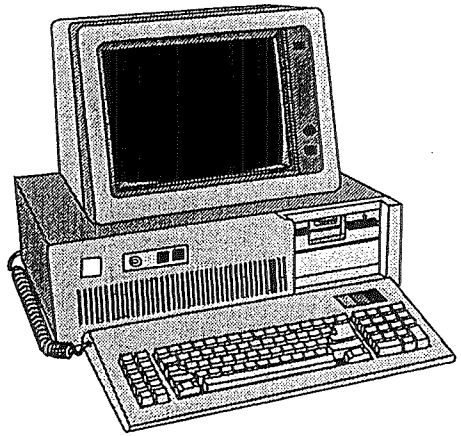


Progress reports

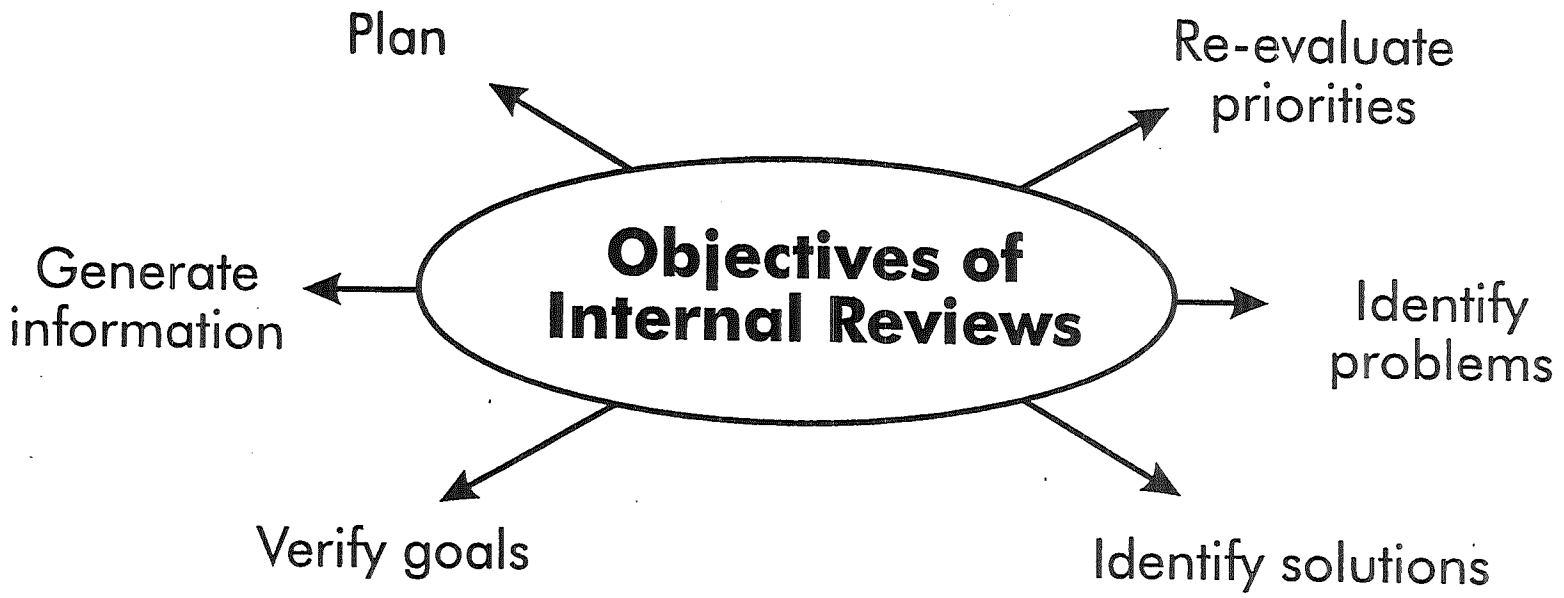


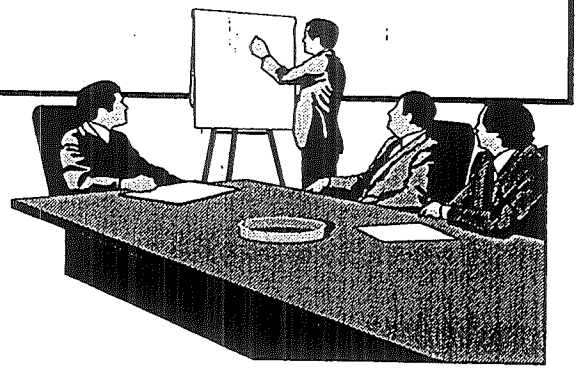
Internal reviews





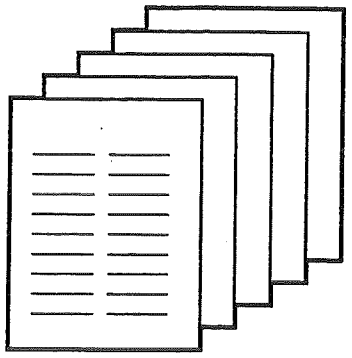
Project databases


Plan
Re-evaluate priorities
Generate information
Objectives of Internal Reviews
Identify problems
Verify goals
Identify solutions



Preparation of Progress Reports

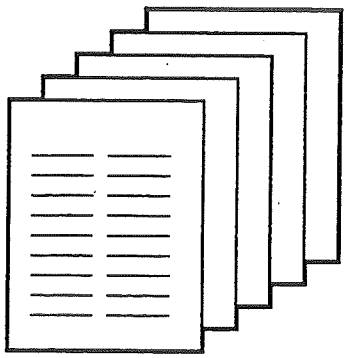
- ❑ Predefined formats
- ❑ Periodicity
- ❑ Style
- ❑ Audience
  - ✔ Researchers
  - ✔ Producers
  - ✔ Extensionists
  - ✔ Administrators
  - ✔ Planners
  - ✔ Professors



- ❑ Relevant information depending on management level

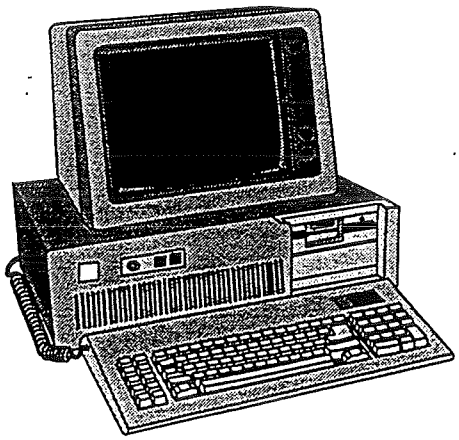
Contents of a Progress Report

- ❑ Title of project or activity
- ❑ Report summary
- ❑ Objectives and expected results
- ❑ Methodology
- ❑ Main achievements and findings
- ❑ Problems and possible solutions
- ❑ General conclusions
- ❑ Financial summary (for administrative reports)



Characteristics of a Project Database

Institutional	❑ Clear definition of objectives ❑ Organization by projects
Design	❑ Flexible ❑ Simple
Information	❑ Valid ❑ Relevant ❑ Up-to-date
Operation	❑ Speed and flexibility ❑ Low cost
Outputs	❑ Reports on request ❑ Useful for decision making ❑ Cost information ❑ Feedback to research



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.

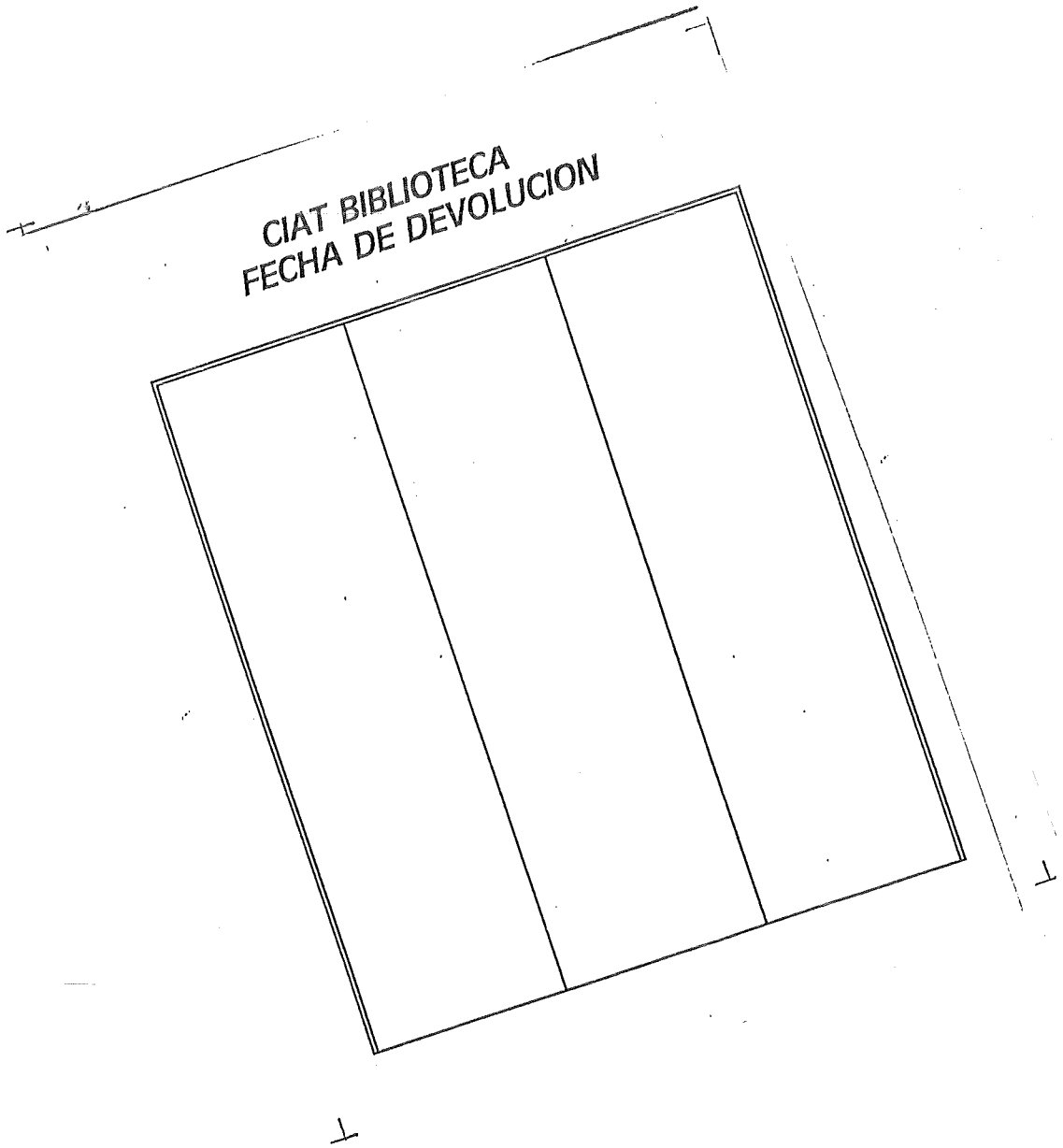
ISNAR is a nonprofit autonomous institute, international in character, and apolitical in its management, staffing, and operations. It is financially supported by a number of the members of the CGIAR, an informal group of donor that includes countries, development banks, international organizations, and 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.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