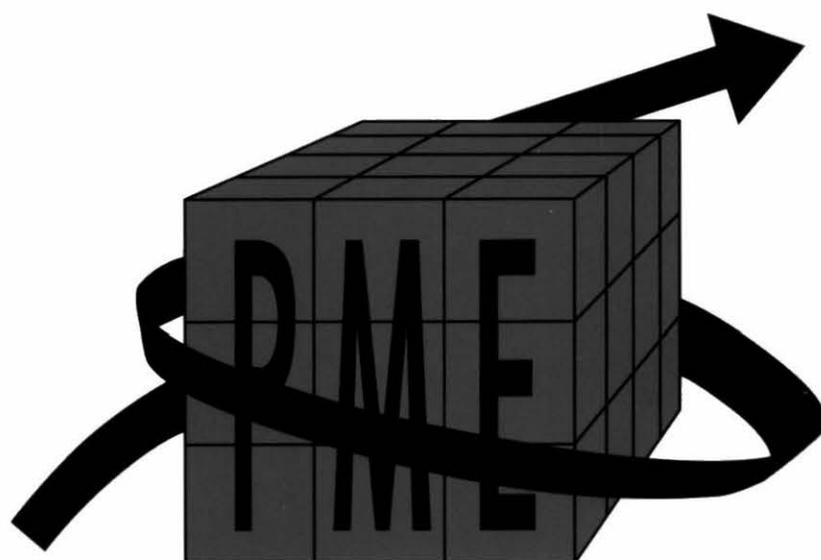


Training in Planning, Monitoring and Evaluation for Agricultural Research Management

Manual 1 The Strategic Approach



Silvia Gálvez
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for National Agricultural Research

1995

 **CIAT**
International Center for Tropical Agriculture
Centro Internacional de Agricultura Tropical

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Send us your ideas

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

Manual 1

The Strategic Approach to Agricultural Research Management

INIA

Institute for Agricultural
Research,
Chile

PROCADI

Colombian Program for
the Advance of
Research, Colombia

EMBRAPA

Brazilian Corporation for
Agricultural Research,
Brazil

MAG

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Preface

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

These materials were designed to:

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

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

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

Acknowledgments

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

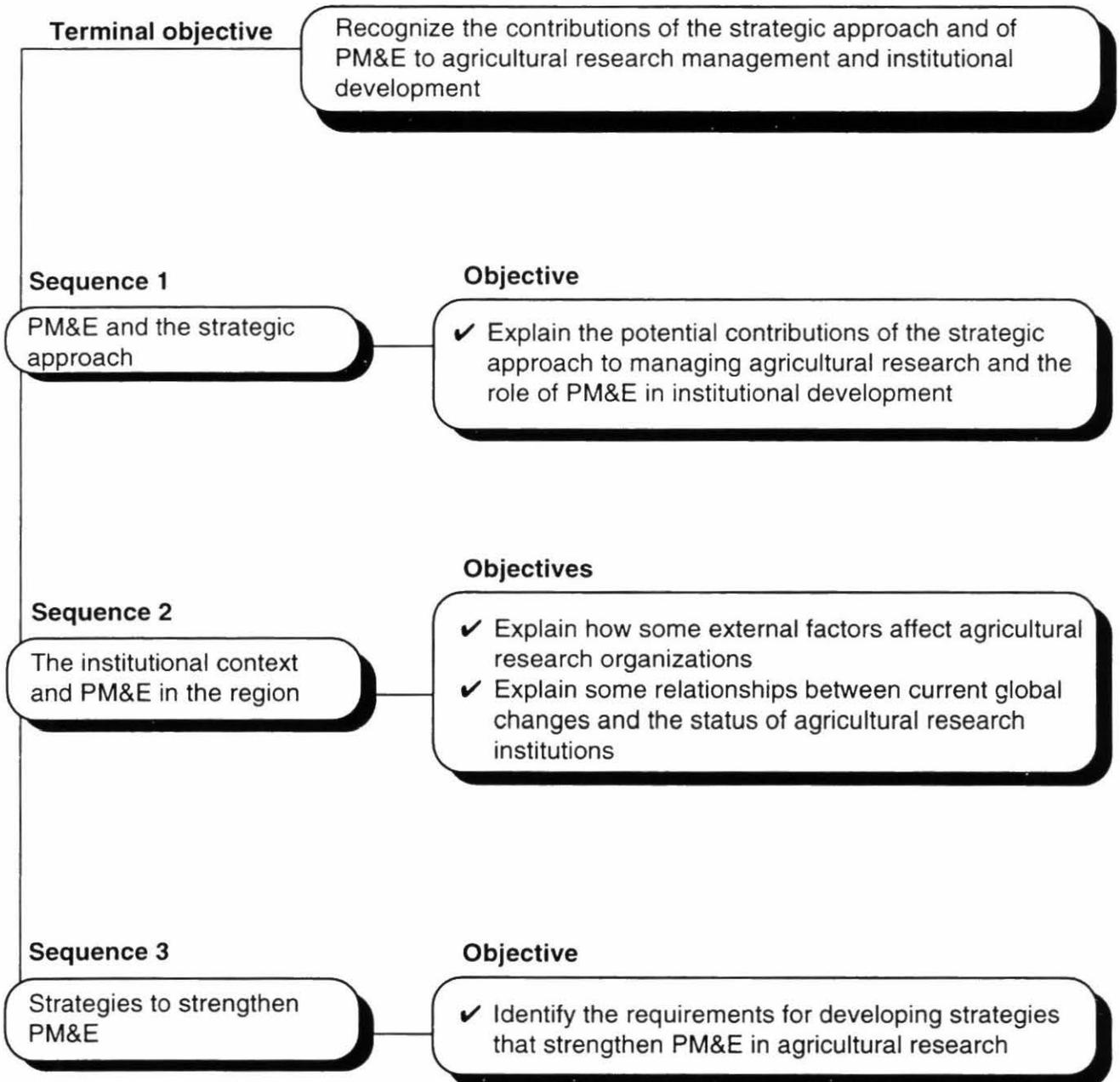
We would like to thank Christian Bonte-Friedheim and Gustavo Nores, Directors General of ISNAR and CIAT, for establishing the inter-center collaboration that facilitated the production of these training materials. We would like to give special thanks to Douglas Horton of ISNAR for his leadership in the 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, Lucy García S. demonstrated a high degree of professionalism and dedication and helped us throughout the complex and tedious process of preparing the text and supporting materials. We would also like to thank Flora Stella de Lozada, who ably transcribed the initial materials; Juan Carlos Londoño for his numerous and invaluable contributions to the design and production of the final module and transparencies.

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

Flowchart for Manual 1



Introduction to the Manual

The turmoil, uncertainties and breakthroughs of the 1990s have surprised and confused many of us. Many of our institutions have developed without well-defined missions and lack strategies that allow them to capitalize on current trends. Adequate internal mechanisms for defining a new course of action and for assigning existing resources are also lacking. This is a time of crises. Most institutions, however, fail to understand the problems they are facing. They are used to being faced with isolated and well-defined problems such as a financial problem, with budgetary or salary implications; a political problem, with implications for program and project continuity; an internal administrative problem, with implications for institutional integration and for operational processes.

Today, however, society is experiencing a "chain of crises," involving environmental, social, economic, technological, political, ideological and institutional aspects. They all affect our outlook on the world.

What changes are occurring? How are these changes affecting research institutions in general and agricultural research institutions in particular? What initiatives can be taken to strengthen the sustainability of agricultural research institutions? What kinds of approaches and processes can help modernize and strengthen agricultural research management?

Crises create the need to overcome them in a creative way. The greater the crisis, the greater is the outburst of creativity within society and within its institutions. This workshop, divided into four manuals, aims to contribute to this period of creativity in which all nations, and institutions are struggling to overcome unprecedented crises.

In the first manual, **The Strategic Approach in Agricultural Research Management**, workshop participants will critically analyze the current global situation. Participants will reflect on what this global crisis means for the agricultural research sector, and on the options that institutions have to face the challenges this crisis poses. To achieve these objectives, **Manual 1** is divided into three instruction sequences.

Sequence 1: PM&E and the strategic approach

On the basis of introductory texts on each topic and the results of individual and group analyses, the participants are encouraged to produce, as a group:

- an argument on how the strategic approach can be applied in agricultural research management;
- an analysis of how PM&E could strengthen agricultural research management;
- recommendations for developing an effective strategy to strengthen PM&E in agricultural research institutions.

Sequence 2: The Institutional Context and PM&E in the Region

Participants are encouraged to produce, as a group:

- a critical study of global changes and some of their implications for agricultural research institutions, after reading and introductory text on the topic;
- a critical analysis of the status of PM&E in Latin America and the Caribbean, after reading a summary of the reports of 13 case studies carried out in the Americas.

Sequence 3: Strategies to Strengthen PM&E

On the basis of an individual analysis of introductory texts and group exercises, Sequence 3 encourages the participants to produce, as a group:

- a critical review of what a strategy is;
- a summary of basic principles and requirements for designing a PM&E system for an agricultural research institution.

Other PM&E Manuals

The other three manuals discuss:

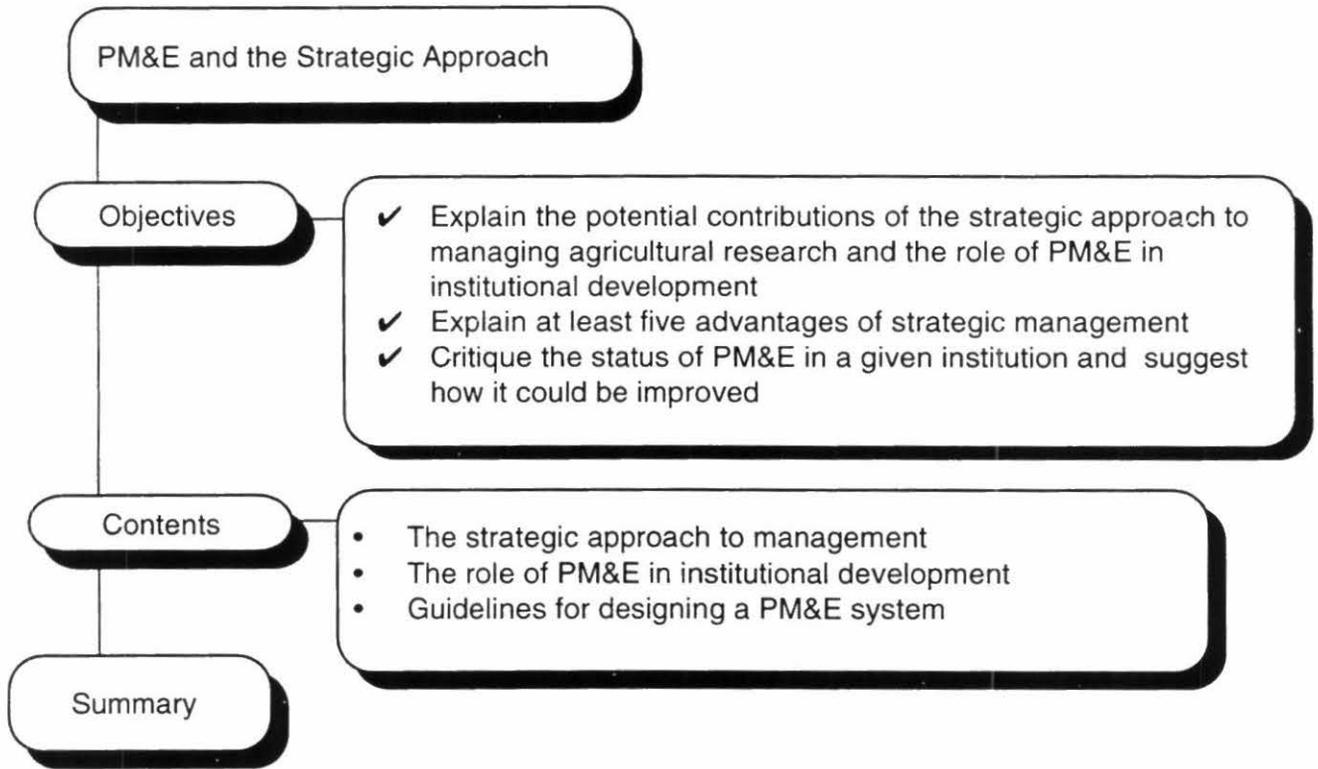
- Strategic planning for agricultural research management;
- Monitoring for agricultural research management;
- Evaluation for agricultural research management.

These manuals discuss in depth the topics that Manual One introduces. We invite our readers to study the contents of the other three manuals to obtain a comprehensive overview of agricultural research management and of PM&E.

Sequence 1. PM&E and the Strategic Approach

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Flowchart for Sequence 1



The Strategic Approach to Management

Origin

Most people associate the word “strategy” with military activities where generals design campaigns to defeat the enemy. In the 1960s, this concept was incorporated into the “business war” (Gaj, 1990). Companies like IBM, General Electric, Volvo, and CITICORP were among the first to adopt the “strategic approach” (Hanna, 1987).

In the 1970s, the strategic approach moved to management and related fields. As a result, the concept of the “global society” was introduced, two specialized journals were created, a conference on this topic was held every year, and many related studies were carried out, mainly in Europe and the United States. The father of this movement, and the first scientist to use the term “strategic management,” was H. Igor Ansoff of the University of San Diego, USA. Other founding members of the movement were Derek Chano (Business

School of Manchester, England), Henry Mintzberg (McGill University, Canada), Phillippe de Woot (Louvain University, Belgium), and Dean Schendel (Purdue University, USA) (Gaj, 1987).

In short, during the 1970s, the strategic approach complemented traditional management with insights, concepts, and methodology necessary to manage complex and dynamic institutional environments.

Concept and characterization

Contrary to what many believe, strategic management is not just a series of concepts, methods, and techniques that can be taught in the classroom. Strategic management is more a combination of philosophy and behaviors for developing knowledge and attitudes that have serious implications for organizational culture.

Many theoreticians and practitioners have developed and adapted concepts and methods for strategic management (Gaj, 1987, 1990; Dean and Cassidy, 1990; Godet, 1987; Johnson, 1987; Oliveira, 1991; Wright and Pringle, 1992).

The most important thing about strategic management is not the tools, but the “strategic purpose” of those who practice it. Little is achieved if the tools are available, but there is no strategic purpose. A strategic purpose can even overcome the lack of some tools.

In this context, strategic management is an approach—a different way of understanding and practicing management—that recognizes and highlights critical managerial aspects such as:

- the importance of the environment, with its opportunities and threats;
- the importance of a client-centered action plan;
- commitment to long-term goals and institutional sustainability;
- “intelligent investments” like human resource development, which have a multiplier effects within the organization;
- commitment to the principles of total quality at all organization levels;
- the importance of competitors as reference points for organizational performance;
- the challenges represented by complex realities and by social, political, and economic turmoil;
- mobilization of internal creativity and expertise.

Several of these aspects should be highlighted when referring to the strategic approach to

agricultural research management. For example, clients, beneficiaries, partners, and users of research and technology transfer organizations constitute a particularly important sector. The strategic approach stresses client-oriented activities.

Since research institutions promote technology generation and change, they must have long-term projections and invest strongly in developing human resources. As mentioned previously, the strategic approach to management encourages internal creativity and expertise that will promote innovative, timely, and continuous advances, particularly in the case of research institutions.

The aspects mentioned help characterize the strategic approach to management. This approach does not make traditional management obsolete, but provides a new direction to tactical and operational issues. Table 1 summarizes some of the main features of the strategic approach to management.

The strategic approach to management does not make traditional management obsolete, but provides a new direction to tactical and operational issues.

Table 1. Principal features of the strategic approach

<ul style="list-style-type: none"> • Plans on the basis of turmoil and lack of continuity. • Builds alternative scenarios to clarify uncertainties and future trends, and the forces that cause them. • Focuses on the market and the demands of clients, users, and partners. • Builds a strategic culture to achieve a flexible organizational behavior that adjusts to changing conditions. • Employs a holistic approach to explore the complexities of reality. • Gives higher priority to environmental factors than to internal organizational factors. • Promotes a new institutional behavior. 	<ul style="list-style-type: none"> • Accepts changes because they can adjust the course of the organization according to emerging trends. • Gives priority “intelligent investments”; in other words, applying resources to factors that transform other factors. • Uses an interdisciplinary approach. • Promotes decentralization. • Prefers collegiate decisions. • The order of priorities is: strategic planning, tactical, operational. • Planning, monitoring, and evaluation are integrated as parts of the same process. • Its commitments are long-term, medium-term, and short-term, in that order.
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Basic components of strategic management

A strategic intention. Many institutions have difficulties in formulating a plan that guides them to a successful operation, especially in times of change, when uncertainties and conflicts prevail. The top management of these institutions lacks what is called in strategic management the “strategic purpose” (de Souza, 1993). It consists of the ideal combination of the following elements:

- a **futurist view** of the institution;
- the **conviction** that it is important to have a strategic plan that can turn this vision into a reality;
- a strong **desire** that this strategic plan will succeed;
- the political **will** to make the formulation and implementation of the strategic plan viable;
- the **courage** to assume the risks underlying an initiative of this type and magnitude.

Long-term commitment. Agricultural research requires a long time from initial conception to the ultimate adoption of research results. However, the daily pressures on institutions make long-term commitments difficult. Most managers focus their attention, energy, and resources mainly on operational activities and, at the most, on tactical processes.

If an agricultural research institution continues to follow this pattern, it will probably not succeed during the chaotic 1990s, faced with the challenges of the 21st century. But, the institution will not solve the problem by disregarding operational or tactical plans either.

One of the main features of strategic management is its long-term commitment. By using specific techniques to build alternative “future scenarios” and by applying the concepts and methods of strategic planning, institutions will be able to:

- assess the external environment to identify opportunities and threats;
- assess the institution’s status;
- trace the future course of the institution;
- determine the differences between current institutional capacity and the conditions needed to follow the proposed course using “gap analysis”;
- develop a strategic plan;
- translate this long-term plan into an action plan;

- formulate a plan to adjust the organizational structures; and
- design and establish an integrated planning, monitoring, and evaluation system.

Institutions must become more flexible and innovative in order to make appropriate decisions for the future. To introduce the strategic approach to agricultural research management, managers must break with the past. This is difficult, particularly if their institutions were successful. A successful past can be the worst enemy of change since it is difficult to accept that some things are wrong and must be changed.

Strategic culture. Most institutions find it difficult to adopt changes that have serious implications for their organizational culture. According to Gaj (1987), institutions fall into four groups regarding their reaction to strategic management:

Strategic management can make agricultural research organizations more responsive to changes in their external and internal environment and more successful in introducing new ideas.

- institutions that easily and quickly grasp strategic ideas, but also abandon them very easily;
- institutions that assimilate new ideas very slowly, but do not abandon them easily;
- institutions that assimilate new ideas openly, either slowly or quickly, and incorporate them widely, sticking to them;
- institutions that accept strategic ideas with difficulty and abandon them easily.

Strategic management helps an institution to:

- accept that a “strategy” implies change;
- produce a “strategic vision”;
- invest in “strategic training”;
- convince all involved that **the organization needs to be analyzed**, allowing both its strong and weak points to be identified (internal prerequisite);
- convince all involved that **the surrounding environment needs to be analyzed** to build appropriate environments for the future (external prerequisite);
- assume **flexibility** as a principle;
- handle **conflicts** and **opposition**.

Strategic management in agricultural research

How can an institution become more competitive and viable? Incorporating the strategic approach to management is one answer to this important question. There are two major reasons why the strategic approach should be applied to agricultural research management.

1. Institutional sustainability

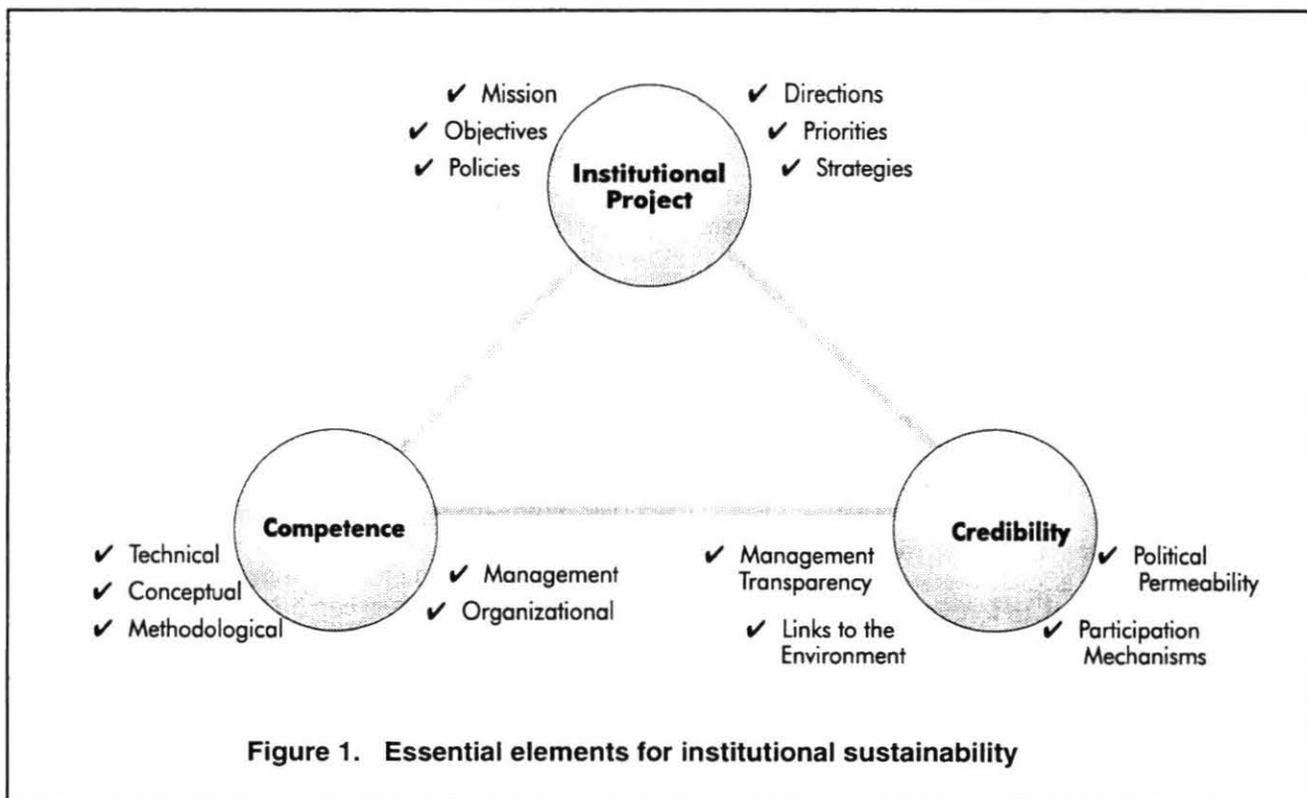
Institutional sustainability will become more difficult to achieve in a world full of uncertainties, global conflicts, technological and economic competition and with institutions under an increasing pressure to become more efficient. According to de Souza (1993), strategic management can contribute to sustainability of agricultural research institutions in at least three ways:

Institutional project. Through strategic management, an institution can develop a strategic plan with a stated mission, philosophy, objectives, policies,

directions, priorities, and strategies that guide the institution into the future.

Institutional competence. Having a good plan doesn't help an institution if it cannot successfully carry it out. Strategic management strengthens the technical, conceptual, methodological, organizational, managerial, and structural capacities of institutions.

Institutional credibility. A good plan and the ability to carry it out still do not guarantee an institution's success. The institution must gain the credibility of the social and political groups that are demanding that institutions focus on the market and on the needs of their users, clients, and partners. Through strategic management, institutions have greater management transparency, enhanced linkages with the environment, and greater political and social permeability. It also improves participation within the institution and with users, clients, and partners, and employees (Figure 1).



2. Mobilization of human resources

One of the major challenges facing agricultural research institutions in this decade is internal integration; this is, the difficulty or impossibility to generate or increase the creativity and vision of its own human resources.

Advantages of participatory models and processes are increased output (both in quantity and quality), greater mutual responsibility and stronger institutional legitimization and commitment. The complex activities of an agricultural research institution require a high level of internal integration. If integration is poor, the institution will be unable to operate as an efficient system to produce knowledge and technology.

Organization of the strategic approach to management

Simplified strategic management system

Many of the smaller, less complex, institutions have not yet begun institutional change, because they think that the available models are too complicated. Small, relatively simple institutions, however, can rely on a basic strategic management system that includes the following characteristics (Gaj, 1987) (Figure 2):

- strategic diagnosis;
- strategic development;
- process management;
- strategic budgeting.

These elements are closely interrelated and interdependent, and cannot be managed separately. To ensure that this simplified strategic management system succeeds in simple or averagely complex institutions, these elements must be combined and integrated in the best possible way.

- **Strategic diagnosis** allows institutions to review the management and organizational attitudes toward their future. Institutions can identify real institutional needs in relation to future goals, and can define the activities that should be initiated to achieve these goals.
- **Strategic development** simplifies the allocation of resources and efforts, whether to obtain relevant information, to formulate training plans, or to make organizational or structural adjustments. Strategic development means moving from one specific point to a more advanced point. It implies action.
- **Process management** consists of developing schedules, making them operational, and



Figure 2. Basic strategic management system

meeting the time limits that are set for the strategic institutional change. It also means designing special projects (that can be called "strategic projects") to help solve specific institutional problems that need to be treated differently than daily routine problems.

- **Strategic budgeting** regulates the flow of available funds, analyzes the possibilities of obtaining resources, establishes the pace of the transformation process and favors "intelligent investments," assigning resources to factors that transform other factors.

Comprehensive strategic management system

Highly complex institutions can also have a strategic management system (Gaj, 1987). In this case, the system will be more complex (Figure 3). A complex institution can begin by introducing the basic system described in Figure 2, and then broaden it to a comprehensive strategic management system.

The transition from the simple system to the comprehensive system can be carried out by adding the following stages (Table 2):

- managing opposition and conflicts to the "strategic diagnosis" component;
- strategic training and the strategic information system to the "strategic development" component;

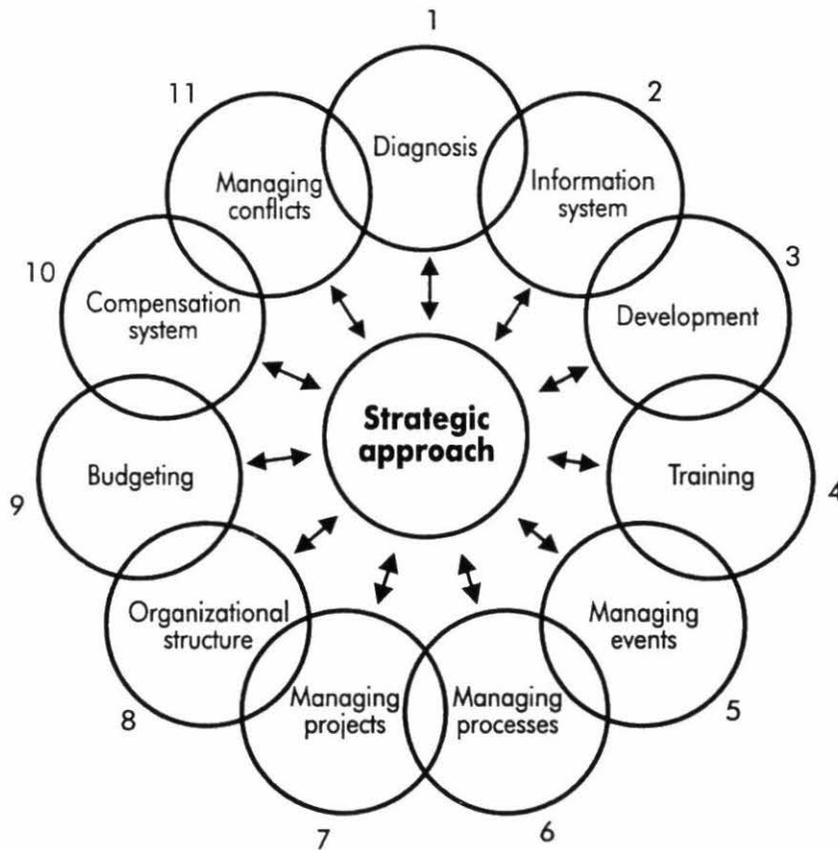


Figure 3. Comprehensive strategic management system

Table 2. Components of a strategic management system

Basic components	Complementary elements
<ul style="list-style-type: none"> • Strategic diagnosis • Strategic development • Process management • Strategic budgeting 	<ul style="list-style-type: none"> • Managing opposition • Managing conflicts • Strategic information system • Strategic training • Managing events • Managing projects • Organizational changes • Compensation system

- managing events and managing projects to the "process management" component;
- organizational structure and compensation system to the "strategic budget" component;

There is a summary of the additional elements making up a comprehensive strategic management system.

Managing opposition and conflict identifies the need for action when during the process of institutional change, opposition or conflict hinders the implementation of institutional development.

Strategic information system organizes relevant, quantitative and qualitative information on both external and internal environments of the

organization. This information is essential when making technical and management decisions during institutional development.

Strategic training involves the adoption of a terminology that facilitates the understanding and interpretation of the philosophy, concepts, principles, and techniques that support organizational development. This common terminology will prove useful when defining an institutional position on the diverse topics debated during the process of institutional development.

Managing events involves the management of important events outside the process of institutional change that can negatively affect the organization. The management approach of these events differs from, and does not depend on, the management of institutional change.

Managing projects deals with the major problems or challenges identified in strategic diagnosis, considered as "strategic plans". They have their own budget and management approach within the overall management of the transformation process, although they depend on its overall logic.

Organizational structure. Organizational changes are needed to better serve the overall strategy of the transformation process and to contribute to the achievement of its general objectives.

Compensation system aims at enhancing the motivation of staff and at creating an attitude that favors strategic activities. This system acknowledges that human resources are the creative force necessary to prioritize institutional change.

Managing institutional change

One of the greatest difficulties that managers face is managing institutional change. The following eight suggestions form part of an action-oriented system and indicate how agricultural research institutions can implement institutional change according to the strategic approach (Hanna, 1987; Gaj, 1990).

The key isn't producing plans, but adopting a strategic attitude toward the future.

- Upper-level managers should direct institutional change. To do so, they must receive strategic training on how to lead organizational change.

- The support, direct participation, and political commitment of managers are essential for successful institutional change. In this sense, managers should actively participate in the strategic planning process from the beginning until the changes are effected.
- Two of the most important aspects that managers should keep in mind when managing institutional change are (1) the participation of all people involved in the process of change and (2) their commitment to the results and implications. Participation by staff influences the viewpoints and, consequently, their decisions. "Good" plans can fall through if those executing the plans are not seriously committed to them. Institutions that invest strongly in human resources take account of the strong weak points of their staff in their institutional strategy.

The role of planners is to facilitate and intensify the learning process, and design "pilot changes" that clarify and refine the strategies so subsequent action can take place.

- Planning succeeds when it is linked to performance. Planning benefits from experimentation, feedback, and other organizational learning methods.
- Strategic planning of change should initially, and mainly, focus on ideas, approaches, models, paradigms, problems, and challenges. This is contrary to the usual preference to data collection, structures, and procedures. The strategic planning process should establish a genuine dialogue among all levels of management on key assumptions, strategic issues, and options of change.
- Change becomes more efficient as the protagonists learn from experience. It is therefore necessary to apply the "dosage principle", which means that the strategic planning process and the resulting changes are carried out in stages. During the initial stages of this process, the "dosage principle" must be practiced in a simple and informal manner, as closely as possible suited to management interests.
- From the beginning onward, managers should consider redesigning their PM&E system, so that the individual activities can be integrated into one single, systematic, and continuous process. The process should be highly flexible so that the necessary adjustments can be introduced over

time. Management should also consider the interrelationships among all institutional (research institution, research center, etc.) and pragmatic (plan, program, project, etc.) levels.

- From the conception of the general strategy of the transformation process onward, a constant concern should be to link new concepts, approaches, and methods to the main characteristics of the current organizational culture before changing it. Transforming the current organizational culture should be a gradual process, which can take five to ten years to complete, depending on the participation of the different protagonists at all levels. The general rule is to begin with the existing organizational culture, then introduce new ideas to the most significant aspects of this culture,

allowing the maximum degree of participation. Increasingly more changes can thus be achieved.

Principles of total quality

Many institutions have difficulties in improving the quality of their activities, processes, and products. This situation is even more critical in institutions that carry out complex activities, as in agricultural research institutions. Strategic management believes that “total quality” is a way of solving this problem. EMBRAPA, the Brazilian Corporation for Agricultural Research, applies 10 principles of total quality (Table 3), which they have adapted to their specific situation. There is a summary of these principles:

Table 3. The ten principles of total quality

1. Client satisfaction	6. Process management
2. Participatory management	7. Delegating power
3. Human resource development	8. Dissemination of information
4. Perseverance in goals	9. Quality control
5. Continuous improvement	10. Prevention of errors

- 1. Client satisfaction.** This is the most important quality principle and covers the following aspects:
 - a clear and precise identification of the stakeholders of the research process;
 - an understanding of how the stakeholders of agricultural research evaluate the products and services they use;
 - a permanent interaction with the stakeholders of this research sector; and
 - careful attention to the expectations of the stakeholders of agricultural research.
- 2. Participatory management.** Participatory management means creating effective participation by the institution’s staff. It means sharing ideas and responsibilities, and ensuring the commitment of all those involved in the management processes. The following aspects are a part of participatory management:
 - encouraging the sharing of opinions and new ideas
 - exchanging information
 - ensuring participation in the decision-making process
 - stimulating leaders who are committed to total quality and the institution’s future

- adopt an management attitude
- improving relationships with entities that represent stakeholders of agricultural research

- 3. Human resources development.** The following aspects are considered:
 - valuing staff members, emphasizing his/her development and fulfillment
 - providing training to improve work performance and to overcome formal education shortcomings.
 - additional work motivation
 - work satisfaction, including adjusting the staff’s professional profile to the activity profile
 - adequate hygienic, environmental, and security conditions for work
- 4. Perseverance in goals.** New values should be incorporated based on the existing organizational culture. Putting this principle into practice depends on:
 - persistence in activities that update the organizational culture
 - coherent attitudes
 - clear and precise definition of purposes within the strategic planning process
 - convergence of actions based on trust and commitment

5. Continuous improvement. This principle stimulates action-oriented attitudes and permanent and critical assessment of all processes. Aspects covered include:

- outspoken attitude to improve activities, processes, and products
- search for innovation in institutional products, processes, and services
- audacity to propose and assume new challenges
- ability to incorporate new concepts, techniques, and methods
- identification and use of performance indicators

6. Process management. If process management is to be implemented, institutions must carry out the following activities:

- identify, the "client-provider chain" in every major institutional and program process. Every employee is, at the same time, the client of at least one other employee and provider of at least one other
- permanently use the planning, monitoring, and evaluation process, following a cycle where planning, implementing, revising, and adjusting is a continuous process
- establish indicators to measure productivity and quality within any given process
- end any departmental feuds and promote integration among areas which cut across the same processes

7. Delegation. Delegation deals with providing clients with timely and specific attention by giving more authority to those who are closer to the client. This implies:

- decentralizing the decision-making process
- providing greater autonomy to middle management
- placing decision making where the action is
- providing support to decentralized activities and delegated decisions
- contracting outside services for activities that are secondary but necessary and require expensive infrastructure or training that other institutions already have

8. Dissemination of information. The information flow within the institution is made as transparent as possible so all the employees can access information when needed. Total quality cannot exist if information is not transparent. This principle implies that:

- employees should be well informed of the

institution's mission, major objectives, policies, and priorities;

- communication channels with the clients should be kept open, so that current information on their expectations and needs is readily available
- the institution's mission, objectives, products, and services should be continuously disseminated
- the integrity of information should be maintained
- information should flow constantly and rapidly
- institutional processes must be totally transparent

9. Quality control. Quality control is a set of planned, disseminated and systematized activities which ensure that products and services adjust to the demands. This implies that:

- norms and procedures be established on how the process should be developed, how the product should be made, and how the services should be offered
- conditions to monitor and stabilize processes be established to allow efficient replication
- reliability indicators be created, and provide clients with the corresponding certification
- the necessary processes to monitor, revise, and correct deficiencies be formalized to maintain quality standards

10. Error prevention. This principle can become both an individual and a collective institutional attitude as it is the essence of a permanent search for excellence. It implies that:

- acceptance of errors be eliminated
- a preventive attitude of error-avoidance be established
- a reduction in internal and external deficiencies be sought to reduce costs while increasing quality

Knowledge as a strategic factor

Developed countries are leaving the century of "industrialized societies" and entering the century of "knowledge societies" (Drucker, 1989) and "information economies" (Davis and Davidson, 1993). The 20th century will be a time in which knowledge will be the major strategic factor for the "global power equation" (Toffler, 1990) and of national competitiveness (Porter, 1990).

The "global power equation" is being rewritten; the order of its components -power, money, and knowledge (Toffler, 1990)- is changing. From the

From the industrial revolution until the present, “money” has been the most important strategic factor; now “knowledge” is becoming the dominant strategic factor in the global power equation.

invention of agriculture, almost 10,000 years ago, until the industrial revolution, in the 19th century, “power” has prevailed in the global power equation. Today, knowledge is the main factor, because it yields power and money, which in turn can be used to produce more knowledge, which again can be used to generate more power and more wealth.

In the coming knowledge societies, the most valuable products will be those that are knowledge intensive (Drucker, 1989), such as a computer chip or an agricultural policy. Science and technology (S&T) now constitute the main organized source of usable knowledge. By the year 2000, nations will be divided into two categories: those with scientific and technological capacity and those without it. The increasing value of knowledge is an emerging reality which will be responsible for the prestige of certain S&T institutions, particularly those becoming more competitive.

Conclusions

The growing importance of “knowledge” as a strategic factor in the global power equation, and in national competitiveness will make knowledge-producing entities such as science and technology (S&T) institutions much more valuable. However, only the most competitive organizations will survive. Less competitive ones must therefore adopt initiatives that make them more competitive.

We are less than 10 years away from the 21st century. Spectacular challenges await institutions. Traditional mechanisms are inadequate to confront these challenges. New concepts, paradigms, models and approaches must be developed. Strategic management invites us to construct them collectively.

In this section we have introduced the topic of strategic management, to motivate and guide managers and other professionals interested in strengthening agricultural research institutions. The text has covered the origin of the strategic approach to management, the concept of strategic

management, its features, and its potential application to agricultural research institutions.

The Role of PM&E in Institutional Development

Why should we plan, monitor, and evaluate agricultural research?

The previous section showed that the prevailing global trends and changes make agricultural more complex because:

- there is greater interrelationship between agriculture and other productive sectors, such as industry, marketing, and services;
- there is greater interdependence between national and international economies;
- there are greater advances in agricultural technology;
- there are greater risks for the small- and medium-scale producer;
- there are greater possibilities for nontraditional agricultural products in the international markets;
- there is a greater diversity of stakeholders, thus a greater diversity in the types of needs;
- there are new actors in the agricultural research scenario, such as unions and other private sector organizations who have relative advantages in generating and transferring technologies to specific clients;
- there is a greater need to recuperate and maintain the natural resource base that sustains agricultural production.

At the same time, the economic reforms and new policies in Latin American and Caribbean countries—which tend to increase the levels of efficiency—compel agricultural research institutions to plan their activities and continuously evaluate their research results.

Research institutions produce, like many other organizations, knowledge and technology. Such products must be competitive and should be client oriented. In other words, research results should be socially useful.

Societies and governments invest heavily in these **enterprises**. Research institutions repay society by producing useful products. Both institutional and research PM&E are means to ensure the production of such goods.

This repayment can already be observed in different areas, at agricultural research institutions, and in several countries in the region. The use of resources is becoming more efficient, global institutional quality has improved, research institutions have the potential to improve competitiveness in the search for financial resources, and both internal and external relationships of institutions have improved. Interinstitutional collaboration has been promoted in more innovative and productive terms, and the quality of outputs has been enhanced significantly.

Planning, monitoring, and evaluation, as components of an integrated and sustained process, can improve decision making at different institutional levels, as well as establish agreements with different external agents. Planning, based on previous evaluations, allows institutional needs to be established, research to be planned and new experiences to be learned. Monitoring, based on well-defined plans, contributes to making adjustments in ongoing activities and programs. Evaluation, as a continuous process based on planning and monitoring, nurtures future plans and how they are carried out. The processes of planning, monitoring and evaluation can also help institutions become more in tune with the environment, become more aware of demands of the technological market and new developments and take adequate measures to adjust its organization and performance to the new conditions.

PM&E as a management tool

Upper-level management (directors and research managers) should use their authority and leadership to implement PM&E processes and maintain them efficiently. By doing so, research objectives, procedures, and results and their expected use will be well-defined and incorporated into the activities proposed in the plan as part of a methodological or reference framework.

As management tools, PM&E activities are essential to improving the capacity of identifying medium-and long-term goals and to developing the ability to anticipate changes in the social, economic, and political environment. These are basic factors in directing the institution. Internally, these activities contribute to participatory decision making regarding the priorities to which resources are allocated at center, program, and project levels, and to improve resource allocation in technical research activities.

Every day, managers make many different decisions. Good decisions need to be based on good information. Unfortunately, decision making is not always based on well-organized and qualified information. Furthermore, not all managers are aware that PM&E is the organization's mechanism to circulate management information. Some of the basic functions of a PM&E system consist in gathering, reproducing, systematizing, interpreting, and disseminating information relevant to all organizational levels. Intelligent managers make "intelligent investments" to access a well-integrated PM&E system.

PM&E as a tool for technical and financial negotiation

PM&E processes must be well known and shared. They must yield the impact of both a wise allocation of financial resources, and an efficient use of human and physical resources.

Progress reports and impact assessment studies show governments, donors, agricultural organizations, and other stakeholders that their investments in agricultural research have produced benefits and research results have been useful. Such reports improve the institution's power of negotiating, leverage, especially when they seek new funding sources. PM&E provides tools which put institutions in a better position to negotiate with political, social and financial sectors.

Institutions can design better projects if they can identify the problems and needs of producers, the private sector, and the consumers through effective linkages. PM&E contributes significantly to improving the relationships between the institutions and society, reducing the gap between research results and societal needs.

However, some managers and researchers are unaware of the contributions that planning, monitoring, and evaluation of agricultural research can make to their institution and its project. This may be because, even though various elements of PM&E may exist at these institutions, as a whole, they are not integrated into the overall management system. PM&E often encounters resistance within an institution because of the procedures and organizational structuring that an institutional PM&E system requires.

PM&E as a tool for institutional negotiation

Projects and programs conduct socioeconomic impact assessments to validate their results and justify resource allocations. External reviews are used to make an inventory of their results when they face changes related to new work scenarios. These two types of evaluation can help link sectors of the institution's environment that by affect agricultural research by helping to define alternative fields of action and to motivate the necessary changes and to forge strategic alliances.

Socioeconomic impact assessments and external reviews can serve to link the institutions to outside sectors; they can also define alternative fields of action and can provide the incentives to implement the needed changes.

Planning, monitoring, and evaluation can help agricultural research institutions successfully confront the challenges mentioned above. To do so, PM&E must be based on basic, interrelated principles which contribute to building an institutional PM&E environment. To create this environment, the principles, methods, concepts and meaning of PM&E should slowly gain a foothold within the organization. Once PM&E is applied, it will gain in utility and quality and will progressively become established in the institution.

Guidelines for Designing a PM&E System

Research institutions can design a PM&E system that suits their interests, resources, and possibilities on various ways. Institutions may decide to assimilate or adapt plans from similar institutions in the region. Sometimes parts of these plans can be used to design a totally new plan. The source of the ideas is unimportant; the important point is to ensure that the PM&E system responds to the institution's needs, characteristics, and potentials.

Latin American and Caribbean agricultural research institutions differ in the conceptual framework and operational definitions they use to organize and apply PM&E. The first part of this section discusses several basic definitions taken from a literature review and regional experience. These definitions will help establish common meanings. In the second

part, several criteria that are considered essential to help design efficient institutional PM&E systems in agricultural research are proposed.

Definitions

Every definition is by itself restrictive—it establishes limits to concepts and meanings. However, definitions are necessary to establish reference points that allow these concepts and meanings to be understood and generalized.

The definitions that follow try to fulfill this purpose. Throughout this manual, and in the following training supplements, a common terminology will be used to refer to planning, monitoring, and evaluation of agricultural research. These are operational definitions; they can be used in the specific context of this training course. They must be adjusted, of course, to the operational plans of every institution.

Planning

At the institutional (organizational) level, planning is a dynamic process which sets the institutional course of action toward the **achievement of its objectives**. Planning is “a process for setting organizational goals and establishing the resources needed to achieve them” (Horton *et al.*, 1993).

Planning can also be defined with an emphasis on the environment and the institution's resources: “Planning is the process in which the desired objectives are formed based on the external context to maintain a direction in which an organization can work coherently to allocate the necessary resources” (Johnson, 1987).

Planning in Latin American and Caribbean agricultural research institutions has two basic dimensions: institutional planning and research planning. In the first case, planning is directed towards institutional development, whereas in the second case, planning aims at determining research strategies, objectives, and priorities, as well as defining activity schedules and results (Novoa and Horton, 1994).

Monitoring

Monitoring is often ignored not only in theoretical essays and conceptual models, but also in agricultural research management. Different schools have different approaches to planning and evaluation, and these are generally seen as associated functions. The same does not occur with Monitoring, since it forms part of the implementation

phase of projects and is usually thought of as ongoing evaluation or implementation control (Novoa and Horton, 1994).

Monitoring is "observing or checking on research activities and their context, results, and impact. The goals of monitoring are to ensure that an activity is proceeding according to plan, and to provide a record of input use, activities and research results, and to warn of any deviation from its initial goals and expected outcomes" (Horton *et al.*, 1993).

The terms **observing** and **checking of activities** should be stressed in the definition as well as the relationships between **plans, goals and expected outcomes with the inputs used**.

Monitoring should be used not only in programs and projects but also in departments, research centers and at all institutional levels. It should also be used to identify changing environmental factors.

For Latin American and Caribbean agricultural research institutions, monitoring is used primarily to gather information to make decisions regarding activities, projects, programs, and research centers. It is a joint process by those carrying out the activities and the different decision-making levels. (Novoa and Horton, 1994).

Evaluation

Evaluation is generally defined as "judging, appraising, or determining the worth, value, or quality of research, whether it is proposed, ongoing, or completed. This is done in terms of its relevance, effectiveness, efficiency, and impact. **Relevance** refers to the appropriateness and importance of goals and objectives in relation to assessed needs. **Effectiveness** refers to the degree to which goals have been achieved. **Efficiency** refers to the cost-effectiveness of research activities. **Impact** refers to the broad long-term effects of research" (Horton *et al.*, 1993). Evaluation therefore serves to place a value on research and its results so society can recognize and accept its merit, value and quality.

Principles and characteristics of a PM&E system

The above definitions can help us understand the characteristics and principles that contribute to designing an efficient PM&E system.

To guarantee that PM&E actually contributes to research institutions, it is important to realize that

global changes are imposing new demands on technological innovations. For example, a new dimension must be given to agricultural research and technology transfer because of (1) policies such as privatization, open economy, and subregional integration; (2) new markets for agricultural products and goods; and (3) the need to adjust research and development as well as technology transfer to the challenges of administrative decentralization and regionalization.

On the other hand, institutions should also incorporate new areas of knowledge such as biotechnology and bioinformatics. Institutions must keep in mind the "power" and potential impact of this new knowledge and information explosion.

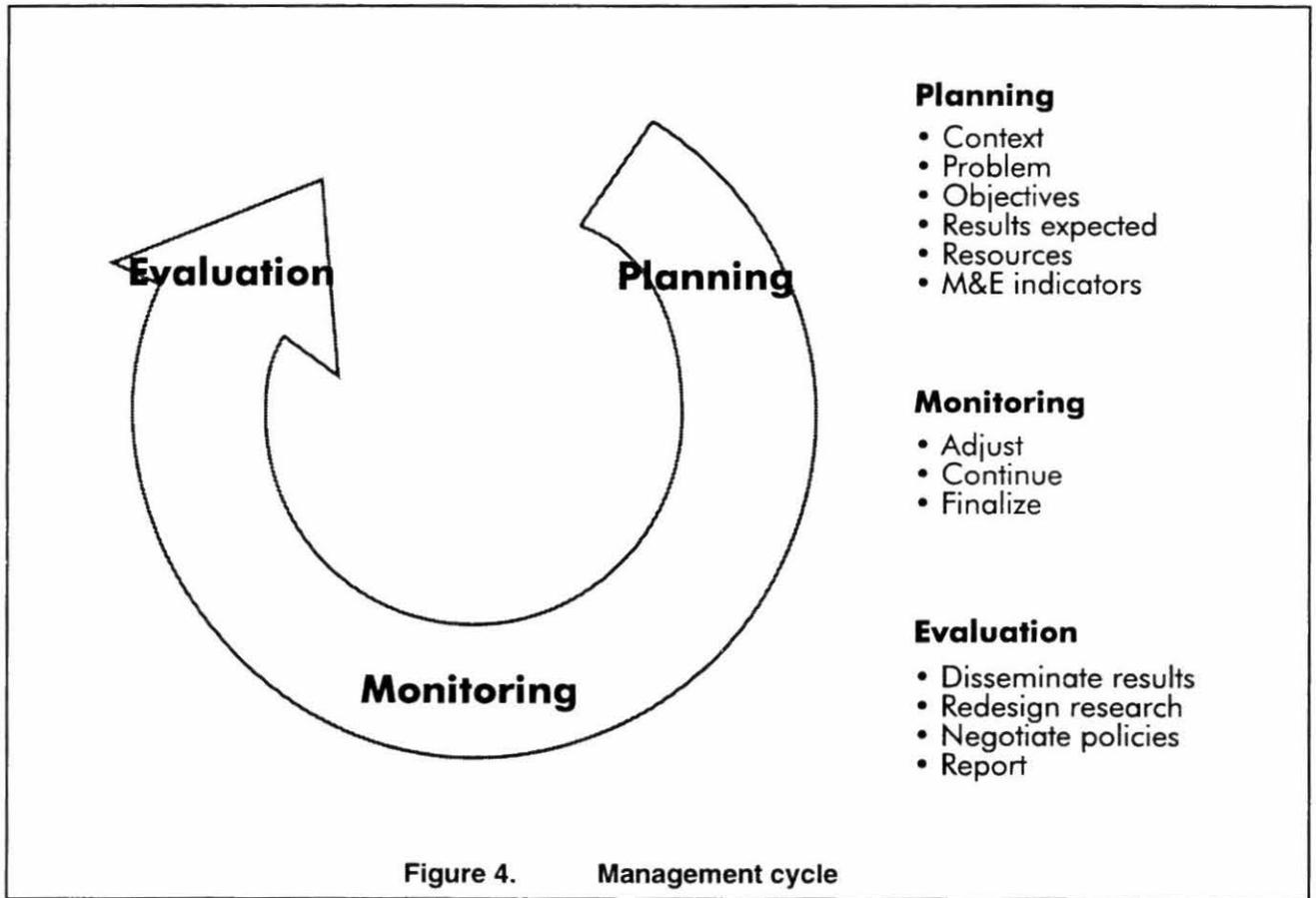
If PM&E is based on fundamental principles, it may help agricultural research institutions face the above mentioned challenges, and at the same time improve management results. These principles are interdependent and hopefully they will all form part of the **institutional PM&E culture**.

Integration

Planning, monitoring and evaluating should be viewed as a part of a continuous process. Actions based on the implementation of PM&E the entire cycle of agricultural research programs and projects. In theory, the product of each component is well defined, but in practice, a line cannot be drawn indicating where one ends and the other begins. A close relationship should exist between project or program planning and the corresponding monitoring and evaluation activities. Figure 4 illustrates how these aspects are integrated into the agricultural research management cycle.

Likewise, each of the PM&E components should be present in all phases of the project or program. When one of these components is carried out, action focuses on monitoring the inputs, technical and administrative processes, activity schedule, and outcome. Monitoring and evaluation are therefore basic elements that contribute to efficient project or program implementation, while helping planners as well as upper-level management to make informed decisions.

Planning, monitoring, and evaluation should be integrated, to provide coherence and continuity within the management cycle



The integration of PM&E facilitates flow the decisions of makes them known at all levels and ensures that decisions will be enforced.

Integration also contributes to creating a sense of belonging among all institutional entities, while giving coherence to their actions in relation to the institution's mission and objectives.

Integration is also necessary between the diverse actors of the internal and external environment to participate in defining the institution's mission, objectives and priority actions.

Integration establishes a sense of compromise among all those who are involved and reduces the possibility that information is misinterpreted

Integration between the PM&E processes can also be seen from the viewpoint of the institutional levels in which planning, monitoring and evaluation is conducted (Table 4).

Participation

Participation not only means that a person is called on or is present whenever an action occurs, but also that this person makes a commitment to achieve common objectives and contribute substantially to fulfilling this commitment. To participate, one has to share.

In PM&E, participation involves directors, administrative personnel, researchers, and assistants, and stakeholders such as producers and consumers, so that they can all contribute to achieving the objectives. This is done by creating mechanisms to share expectations, plan, define common objectives, and obtain a consensus so that the limited resources available for research are allocated and used efficiently. Participation also means allotting time to jointly carry out those shared PM&E activities at the institution.

To guarantee the implementation of planning, monitoring and evaluation, all actors should commit themselves. In addition, obtaining the expected products of PM&E requires that all internal actors

Table 4. Relationships between planning, monitoring and evaluation at institutional action levels

Level of action	Planning	Monitoring	Evaluation
Strategic			
In relation with the external environment	Construction of scenarios	Indicators of the changes in the context	Cost-benefit analysis (impacts)
In relation with the internal environment	Diagnosis	Indicators of the strategic performance	
Tactical/functional			
Research support	Centers Departments Support units	Monitoring of center, department and unit performance	Evaluation of center, departments and units
Operational			
Research	Programs and projects	Monitoring of the performance of programs and projects	Evaluation of programs and projects

fulfill their roles. For example, researchers should commit themselves to design and conduct the project in addition to providing progress and evaluative indicators. Managers must commit themselves to resource allocation, and directors to relevant decision making.

Therefore, PM&E should strengthen the coordination and participation of departments and units of an agricultural research institution. In this way, the decisions and actions of the institution's planners, executors, and policymakers are formulated around common goals.

The participation principle favors information. Information can help an organization identify its constraints and potentials which in the transfer and generation of technology has different action levels.

Decentralization

Planning should cover not only the center but the immediate periphery of agricultural research.

Planning should attend to the needs of diverse stakeholders.

PM&E must be decentralized. Monitoring should be carried out very closely to those who conduct research, so that it can support and guide the plans. Evaluation should be conducted on site in order to be relevant to the local conditions.

Participation favors decentralization.

Decentralization can help an organization identify constraints and potentials of the different action levels in technology transfer and generation.

PM&E viewed as a system

Research institutions receive different types of inputs from diverse groups and organizations; for example: funding from the government; trained professionals from the universities; and machinery, fertilizers and other agrochemicals, and equipment from industry. Inputs can also be policy guidelines, information on sectorial and general development plans, and analyses about national and agricultural statistics. A wide range of national and international sectors therefore influence the performance of research institutions.

At the same time, research institutions produce a variety of outputs and products for these sectors and groups of society.

This relationship between the institution's socioeconomic context and its inputs and outputs obtained through knowledge- and technology-generating processes constitutes a general system.

Similarly, within the institution, the relationships between administration and management units, between research programs and projects, and between regional centers and headquarters form the institutional system.

This concept of an institution as a system, and as part of larger systems, is fundamental to the successful implementation of PM&E processes. To form an institutional development or research plan, institutions need information, human and other operative resources, and many decisions. If planning is adjusted to the system's organization and operation, both internally and externally, there is a greater possibility that research will be conducted according to a plan that will deliver the expected activities and commitments. In that case, the evaluation of research results will have greater possibilities of contributing to the advancement of the institution and to the design of new plans.

Each of the components of the PM&E process uses various kinds of information to generate specific products. These in turn, become inputs of another component, and act as end products of plans, of monitoring and of evaluative activities of agricultural research.

Objectives, work plans, outcomes, and control indicators should be well defined in the planning process. These are necessary inputs so that monitoring can take place. Furthermore, the actions considered during planning (definition of objectives, resource allocation, etc.) and monitoring allow a program or project to be evaluated at any stage of its development.

Figure 5 shows the dimensions of (1) planning, monitoring, and evaluation, (2) their relationship with different institutional levels, and (3) the variables. Together they form an integrated PM&E system that proves useful to management aspects of agricultural research.

At any of the decision-making levels, the circumstances and needs of the stakeholders—who, in principle, constitute the **context** of a research institution—should be taken into account when preparing a project. By analyzing this context, research objectives and approaches (inputs) can be selected.

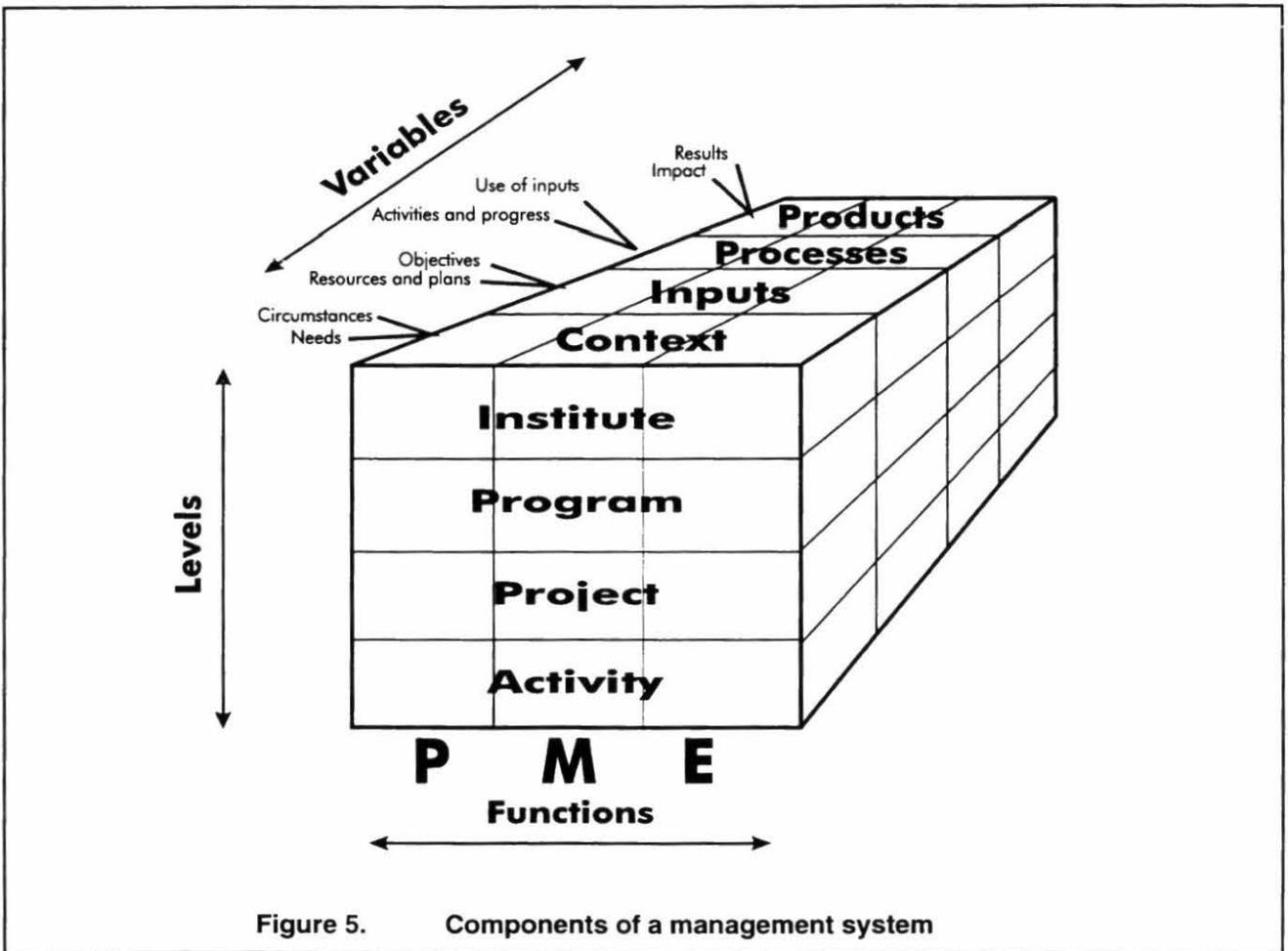


Figure 5. Components of a management system

These **processes** of technology generation and transfer move in successive stages. For management purpose, monitoring is required to analyze progress toward program, project, or institutional objectives.

Products—information, knowledge, and technologies—will result from research and transfer processes. An institution's performance can be determined by evaluating these processes and products, and establishing the planned objectives are being achieved.

In summary, PM&E functions allow upper- and middle-management to assess the **context, input, process**, and **product** variables that affect performance at the different institutional levels.

Client-centered vision

Modern, successful commercial and industrial enterprises are characterized by close links with their clientele. They direct their action toward the needs, demands and preferences of specific markets. They are companies that make products consumed by these markets, and nothing else.

Technology-producing enterprises, such as agricultural research institutions, must direct their product—information, knowledge, and technology—toward their specific clients and markets. These include agribusinesses, universities, commercial producers, small farmers, technical assistants, producers' associations, and policy makers and planners of agricultural development.

All those involved have their own specific needs according to their activities and to what they expect from research results. A PM&E system for research should consider the characteristics of clients and users, and therefore design plans, programs, and projects based on those needs and preferences.

Prevailing worldwide trends force research institutions to become **competitive**, so that these technologies are in tune with producers' expectations. A closer relationship with stakeholders is required, so that their needs can be incorporated into agricultural research priorities. PM&E allows demands for technology to be incorporated in the design of research plans and programs.

Therefore, the planning process should be based not only on the users' needs, but also on national and sectorial development models.

Managerial approach

The essential principles of management, are based mainly on the experiences and work of the private sector and commercial companies that produce and sell different types of goods and services. These principles have evolved over time. Nowadays, according to experts, the management approach consists basically of directing production units, whether small or complex, as competitive and efficient enterprises toward satisfying client needs and market demands. These enterprises must incorporate modern criteria such as participation, decentralization, strategic planning, flexibility, and ability to adapt to prevailing conditions in their specific environment, to their management repertoire.

For agricultural research institutions, the management approach means applying these management principles to institutions as **technological enterprises**. A basic requisite is that PM&E be adopted by the managers of research institutions. Directors, program and project leaders and researchers must understand that planning, monitoring, and evaluation are management and administrative tools on which they should use in their decision making and overall agricultural research.

The management approach can help research institutions transform from bureaucratic, subsidized, and perhaps inefficient, organizations into more competent and efficient enterprises that can compete in the large market of information, knowledge, and technological innovation at the regional, national, and international levels.

The management approach implies changing the mentality of researchers who focus solely on their projects and are isolated from stakeholders. It also brings about changes in programs and projects that are designed to satisfy only specific preferences. The management approach can change them to programs and projects with an enterprise approach, aimed at satisfying the demands of society, and in particular, the demands of farmer groups and organizations.

Institutionalization

PM&E must be structured to form a framework whose mechanisms and tools are homogeneous and sustainable. The purpose is to integrate research activities with factors that influence sustainability and standardize the methodology to

accomplish the institution's short-, medium-, and long-term goals.

Integration and decentralization can lead to an institutionalized PM&E system if they are incorporated at all organizational and operational levels.

The institutionalization of PM&E means that these processes should become part of the policies, culture and life of the institutions, its staff, and its stakeholders. PM&E should be expressed in the policies, plans and programs and subsequently should have specific funding and resource allocations and be part of the operational activities of the research and technology transfer programs and projects.

Institutional organization for PM&E

Research institutions have the necessary components to fulfill their basic functions, mission and objectives. They have specialized units responsible for upper management, financial resource management, personnel, station operations, and laboratories. These units respond to specialized functions that are a part of the overall organizational structure. Most agricultural research institutions in Latin America and the Caribbean have units assigned to the different components, functions or related PM&E issues. A few of them have planning and evaluation offices at the upper-management level; in these cases, PM&E has been defined as a basic institutional function, and therefore is given a place within the structure.

PM&E functions need to be performed at all levels within the organizational structure.

A formal PM&E unit with trained personnel and budget can help the institution adjust to the changing agricultural issues and support the decision-making at all levels.

Decision-making and implementation levels

Figure 6 shows some of the decision-making and implementation levels of agricultural research. The entire system is based on research projects and activities that are consolidated to form research programs. Experimental stations and institutes are found at higher levels within the organization, and, finally, one finds the national agricultural research

system, formed by all public and private research and technology transfer institutions.

The importance of the above scheme lies in the relationship between the different decision-making and implementation levels involved in research. To design appropriate PM&E systems for agricultural research, institutions should consider not only the different organizational levels (from the most specific to the most general) but also the basic principles of integration, participation, decentralization, and user orientation.

An integrated PM&E system can guide the organization toward accomplishing its mission and also influence the social environment to which it belongs.

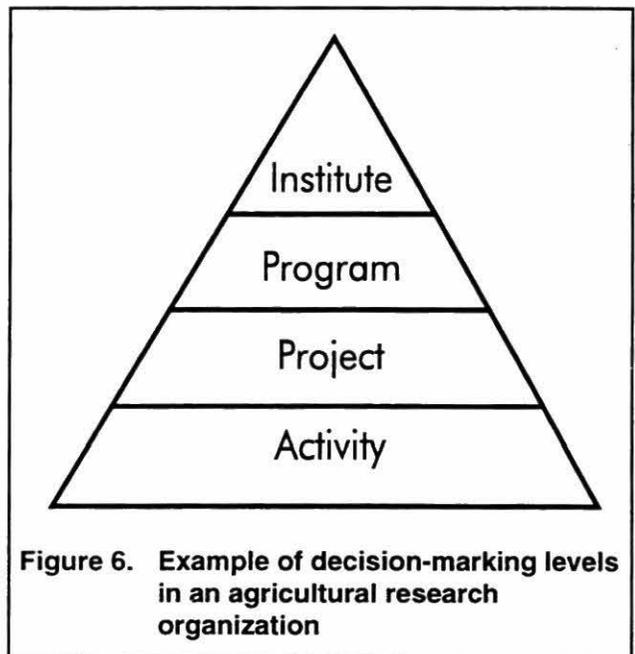


Figure 6. Example of decision-making levels in an agricultural research organization

In effect, the interrelationships among the PM&E components at the different levels can help integrate an institution. The PM&E system of an institution should be designed considering these interrelationships and the aforementioned principles. Relationships imply **reciprocal influence** between each component and level, so that if they are not defined or fulfilled, the institution will lack articulation among its components and will be weakened.

Consequently, the **interrelationship** principle is so important that it should be considered as a key factor in designing planning, monitoring, and evaluation systems for research.

Summary

This sequence outlines a strategic approach to agricultural research management. The sequence begins by referring to the origins of the strategic approach and highlights its concepts and main features. It refers to the role strategic management can play in agricultural research institutions to ensure institutional sustainability and mobilize human resources.

The first part of this sequence details the components of strategic management and how institutions can apply this approach, either comprehensively or simplified. Managerial elements for institutional change are explained. The principles of total quality are described. The importance of knowledge as a strategic factor in modern times is stressed.

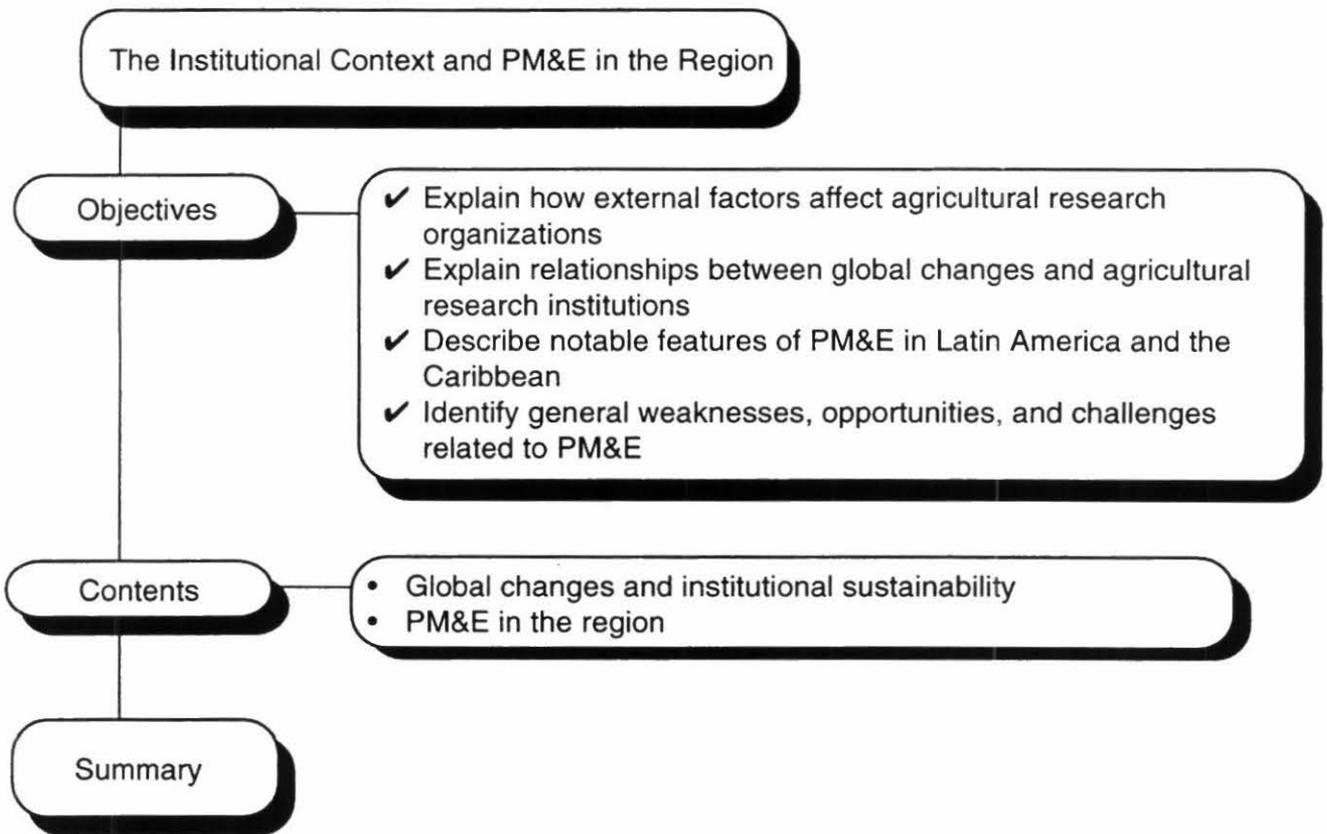
The second part of this sequence deals with the role of PM&E in strengthening agricultural research institutions, covering management, technical/financial negotiation, and political/institutional negotiation aspects. It shows how PM&E can serve as a tool to improve management.

The sequence presents guidelines to design a PM&E system for agricultural research institutions. Several basic definitions of planning, monitoring, and evaluation are provided, followed by a detailed description of principles and characteristics of an appropriate PM&E system. The topic ends with an analysis of the different decision-making and implementation levels at which research is carried out. The sequence stresses that PM&E should help integrate these levels.

Sequence 2. The Institutional Context and PM&E in the Region

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Flowchart for Sequence 2



Global Changes and Institutional Sustainability

In the last decade of the 20th century, profound changes are occurring in many spheres. New realities are emerging from these changes which have serious implications for development models and for the institutions trying to implement them.

This sequence introduces several global changes and presents a hypothesis to explain the close relationship between institutional success and the rise and fall of development models.

General trends

The world is constantly evolving. At times, these transformations are rapid and profound. They can upset approaches, models, and paradigms that

guide social action. Today we are feeling the impact of such an historic moment.

Widespread political and socioeconomic turmoil is changing nations. Countries and institutions can no longer remain passive spectators of the emerging realities. At this point, we must all actively build our future. Some examples of changes that occurred during the 1990s:

- A sociopolitical revolution occurred worldwide: most dictatorships were overthrown. Totalitarian systems, whether in capitalist countries or socialist states, have proved to be socially, economically, and politically unviable. In a broader sense, this revolution suggests that all types of authoritarianism, even institutional authoritarianism, are unviable.
- Improved communication channels have contributed to the rapid globalization of relevant

social issues. Previously, only specialists had access to certain types of information. Now, the general public is becoming increasingly aware of different issues through improved media channels, for the example the environment. There is global awareness of ecological topics, which has led to the evolution of a “sustainable development” approach with “sustainability” implications for all societies and institutions.

Global changes

1. *Most dictatorships have been overthrown.*
 2. *Communication channels have been improved, and social issues were globalized.*
 3. *World economy was integrated, and the cooperation-competition paradox appeared.*
 4. *Regional economic blocs have been formed.*
 5. *The biorevolution strengthened the biological paradigm and weakened the chemical paradigm.*
-

- Increased integration of the world economy has enhanced the interdependence among nations, creating a cooperation-competition paradox. Within this new array of relationships, most countries are forced to cooperate with future competitors and compete with many future collaborators. This paradox significantly affects the type of relationship between different societies and different institutions.
- The United States may be the last hegemonic nation of modern history. It is now almost impossible for a nation to be the best in most development areas. This forces countries to form regional economic blocs, a survival strategy for a new world that is more competitive and interdependent. To succeed, nations must overcome cultural, political, and even ideological obstacles. These regional economic blocs will, no doubt, change the logic with which nations and their institutions formulate their national and international policies.
- Scientific advances in biotechnology are opening the doors to a “biorevolution,” that can influence all productive activities and alter the genetic code of plants, animals, and even human beings. This “biorevolution” in agriculture reinforces the “biological paradox,” while contributing to the gradual weakening of the “chemical paradox” associated with the Green Revolution.

These are just five examples of the many changes that are transforming the world and its institutions. Certainly the ongoing changes will affect the design of new national development models and, consequently, the design of new institutional paradigms.

Challenges for agricultural research

The changes occurring in the world affect agricultural research and development in different ways.

Regional economic blocs and new free trade agreements, such as the Caribbean Community and Common Market (CARICOM), the Group of Three (G-3) and the Group of Eight, the Andean Subregional Pact and MERCOSUR for southern Latin America, have opened trade between nations. This affects the conditions in which agricultural production is conducted and consequently the demands on agricultural research.

An institutional paradigm is a broad concept that guides and influences the members of an organization regarding:

- *its **position** in relation to the external environment*
 - *the set of **values and principles** shared by its members*
 - *the **concepts, approaches, and premises** that guide the organization’s activities*
 - *the **perspectives** used to face challenges and problems*
 - *the types of **commitments** with society that guide the organization’s policies and priorities*
-

This new structure of regional relationships forces research and technology transfer institutions to adjust to the new demands for technological and agricultural products and raw materials. Some of the most significant changes related to the agricultural research are:

- The change in the **demand structure** for food and raw materials. The composition of the population is changing: fewer people work on farms, rural women are participating more in off-farm tasks and the number of agribusinesses is soaring. These changes affect the production of new goods for both the internal and external markets. For example, because of these changes in the market, new demands have been

created for cut flowers, tropical house plants, and processed goods such as concentrated canned juices.

- The surging interest in the **sustainable use and protection** of natural resources, particularly in Latin America with its extraordinary biodiversity, is defining new areas of research that incorporate aspects like sustainability and equity into traditional approaches to agricultural production.
- The presence of **new actors** in technology transfer and generation calls for a new research plan. New actors include unions and other private agricultural organizations, national and multinational enterprises interested in technological developments for more trade possibilities, universities and nongovernmental organizations. New cooperation agreements between the public and private sectors expand this list. These new actors constitute a new structure of the **agricultural research market**, not only as providers of new developments but also as users of different technologies and information.
- New areas of science and knowledge have changed the **infrastructure** for research which was outlined only one or two decades ago. Access to new research tools through biotechnology, applied information science, and microelectronics has resulted in the use of new applications in agricultural research, in the proposal of new themes and research lines, and in the greater participation of organizations and persons previously not involved in research.

In a world where economic relationships between countries and regional blocs are changing, new developments like those above clearly show that research institutions must recognize the importance of the concept of **competitiveness**. New actors, a greater diversity of technology users, better access to the research infrastructure, and an open market to supply and demand research products, create a greater need for research institutions to become more competitive.

This points to the need for agricultural research institutions to search for new arrangements and organizational models, adapt the missions and objectives to the new conditions, redefine their directions and use new and more efficient managerial and administrative plans.

Rise and fall of development models

Institutions emerge, grow, mature, and die just like biological organisms. Our hypothesis is that the success or failure of most institutions is closely related to the rise and fall of development models (de Souza, 1993).

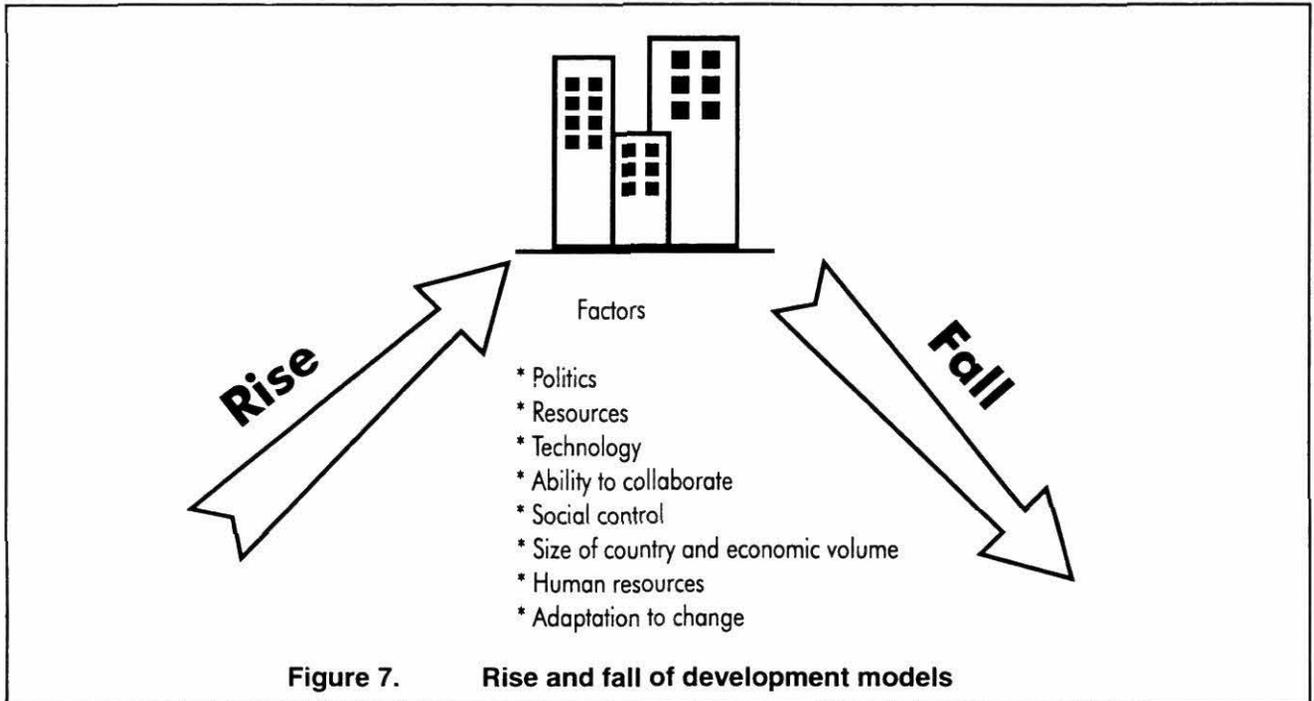
Development is a product of human intervention. Its nature, process, and consequences will always be related to the nature, objectives, and organization of human actions. Society delegates governments to *define development objectives, and finances the means to organize the institutional matrix responsible for transferring the most significant interventions that should benefit most of the population*. The question is: How does development advance?

Development requires a “model” that guides the main actions of its main protagonists and institutions. All institutional development models encourage certain values, premises, and principles. These should be incorporated into the institutional matrix so that the development model fulfills its promise to solve environmental, social, economic, and political problems. These observations lead to the process shown in Figure 7.

The implementation stage begins after a “development model” has been established and the corresponding institutional matrix organized. All proposed actions are based on the model’s values, premises, and principles.

Eventually, however, some mandates proposed in the model will not be implemented. Problems arise that the model cannot solve. In other situations, the actions proposed by the model will have an impact contrary to what the model anticipated. Although these events are considered anomalies, they slowly undermine the development model.

The discontent thus generated by incapacity of development or institutional models to respond to changing events, pushes the academic, political, and social leadership into moments of **intense creativity**. New concepts, approaches, perspectives, and priorities are produced, giving rise to new models. Society, and its institutions, change accordingly.



Different sociopolitical groups begin criticizing these “anomalies.” When these criticisms become widespread, the development model undergoes an irreversible “crisis,” when most of the model’s values, premises, and principles reach a turning point. The organizations using the model have incorporated many of its values, premises, and principles into their institutional paradigms. When a crisis threatens the model it also affects these organizations.

A growing, general discontent with the model causes a kind of nonviolent “revolution of sociopolitical thought.” Intellectual, political, and social leaders debate the cause of the model’s fall and how to develop a new, more suitable and precise model. Creativity is intense, and new concepts, approaches, perspectives, and priorities appear that help form the new development model. Alternative development models are discussed, and one of these models replaces the old one.

Once the new development model is established, a new institutional matrix is organized to make it viable. From the moment a development model enters into crisis until a new model is established, some institutions “perish.” Many change “from the outside in;” only a few will actively generate their own transformation process.

In Brazil, for example, when the military government changed the country’s development model in the late 1960s and early 1970s, several institutions disappeared, such as the Brazilian Association of Credit, Technical Assistance and Rural Extension (ABCAR), and the National Department of Agricultural Research (DNPEA). In the early 1990s, the national development model implemented by the military government collapsed. The country is now struggling to form a new model. With this current crisis, EMBRATER (the Brazilian Institute for Technical Assistance and Rural Extension) has disappeared, while EMBRAPA (the Brazilian Enterprise for Agricultural Research) has begun a successful process of institutional change.

This example illustrates the basis of the hypothesis posed at the beginning of this text: institutional success or failure is closely associated with the rise and fall of development models (de Souza, 1993).

We should realize, however, that institutional change and adjustments are exercises that institutions cannot make every year. Changes in society will affect the speed of the change of development paradigms, but they rarely occur in less than a decade. The analysis of institutional sustainability should therefore be conducted every five to 10 years.

The impact of change and new management approaches

Diverse types of organizations, such as businesses, public groups, universities and research institutions, are confronted with the new development paradigms. Some have met the challenge, or are on the right path and have modified their organizational structures, adopted new management approaches and redefined their mission and objectives. Only those organizations that have adapted rapidly to the new era, interpreting and adjusting to the new demands, can survive and continue to respond to the demands they receive.

The case of research institutions, is similar to those of other organizations. They should have already begun their adaptation to the new era. One way is the adoption of new management and administrative approaches to research and development and forging alliances with the institutions which promote it. The strategic approach to management as described in the previous sequence provides some criteria and guidelines for institutional change. One of them is the adoption and use of integrated systems of research planning, monitoring and evaluation (PM&E).

What is the status of research PM&E in Latin America and the Caribbean? What experience do the region's agricultural research institutions have in PM&E? What are their principal challenges? These are some of the questions that ISNAR/IDB sought to answer through 13 case studies of agricultural research institutions. The following section summarizes the project's principal results.

PM&E in the Region

Novoa and Horton (1994) describe the experiences of agricultural research institutions of six countries in South America, two in Central America, two in the Caribbean, two in North America and Mexico, with PM&E, "Planning, monitoring, and evaluation of agricultural research in the Americas: results of 13 case studies." This section summarizes their findings.

Background and importance

The reports of the 13 case studies show that all the institutions studied carry out some sort of PM&E. All the entities are also interested in, and committed to, *conducting formal and continuous* PM&E activities or in strengthening ongoing ones.

Common elements and differences

Most of the institutions studied already have planning mechanisms such as medium-term plans, indicative planning by program and by commodity, regional planning, and procedures to select and prioritize research projects. The importance given to each mechanism varies among the institutions.

Institutional planning and **agricultural research planning** are carried out at six main levels: strategic, indicative, medium-term operational, program operational, projects operational, and annual operational. **Strategic** and **participatory** planning are new in the region and have not been well developed.

Monitoring is used mainly to verify the progress of programs, projects, and experiments; the use of resources; and the fulfillment of medium-term goals. Monitoring focuses on the operational level of implementing plans and programs, and only occasionally verifies the overall performance of an institution. In some institutions, monitoring aims at gathering data on costs and other indicators of resource use for accounting or verifying purposes. Other indicators are used, such as the number of publications produced, when evaluating researchers' performance. In other cases, monitoring is used to coordinate or organize research efforts and activities into projects or programs that are productive and respond to institutional needs and established objectives.

Experience in **evaluation** is closely related to institutional characteristics, mandates, and fields of action. At larger institutions, the experience in evaluation is richer and more diverse, and the progress in methods and procedures is greater. However, in nearly half of the organizations that the ISNAR/IDB project studied, evaluation is the weakest phase in the overall process of PM&E. As a research management tool, it is the least developed; evaluation is neither institutionalized nor objectively organized, and is indistinguishable from other components or processes.

Experiences, methods and tools

The case studies present various PM&E models. Some of the models are considered sophisticated, comprehensive, strategic, bureaucratic, or successful, depending on the specific circumstances. In other cases, the institutions are beginning to test new approaches, looking for different forms of PM&E and adapting them to their

own circumstances. The relative size of the institutions and their resources, as well as the specialization of their functions, is related to their practices and experiences in evaluation issues.

Practically all institutions monitor their plans and programs sometime during their development. However, significantly less expertise and fewer mechanisms, procedures, and resources are allocated to monitoring than to planning. Monitoring activities focus on the operational level of implementing plans and programs and, occasionally, assess the overall performance of the institution.

Most of the monitoring methods and tools used are informal and time consuming for the researchers and the middle management, and only partly systematized. Field trips and research reports are most frequently used. Databases, written reports, and budget monitoring are used at the project and program levels.

Internal and external reviews and impact assessment studies are the main types of evaluation. Evaluation is carried out at seven levels: overall research system, institutional, program, organizational unit, research and technology transfer projects, research activity, and research personnel.

Throughout the region, institutions use, with varying emphasis and success, practically every evaluation method, procedure, and tool reported in the literature. Projects frequently undergo external reviews; institutions, research centers, and research programs to a lesser extent. Research programs and centers are submitted to internal reviews. These are rare at the institutional level. Impact assessment is infrequently used. These studies evaluate the economic impact of projects within the programs. Impact assessment usually obeys an external demand that the institution or program validate the results obtained and account for resource allocation.

Challenges and perspectives

Most institutions lack an integrated framework for PM&E to aid in deciding what should be evaluated, why, and how. Such a frame of reference should include explicit objectives, and defined information needs and data sources.

In most countries, the private sector is increasing its participation in agricultural research. Institutions tend to consider more and more the market conditions of commodities and technologies. Most institutions now allow the private sector to participate in their processes and decisions. They also are developing different tools to improve the accountability of their activities.

External reviews are expected to link the different sectors that influence the research that the institutions conduct. They also help define alternative areas of activity and encourage necessary changes. In several cases, external reviews have encouraged institutions to implement strategic planning or integrated medium- or long-term planning.

Participation and decentralization. Countries in the region show a growing trend toward administrative decentralization, regionalization of activities, and greater participation of different sectors and clients. This affects institutional planning processes.

Participation and decentralization are required if (1) designing and implementing institutional PM&E is to be managed efficiently, and if (2) PM&E is to be applied at all institutional levels.

On the other hand, the emphasis on participatory planning is especially relevant to the relationships between the institutions and their clients. This participation, however, is hindered by the close relationship that institutions have with producers, other clients benefiting from research, and funding agents who do not always understand the nature of research, particularly when the immediate problems do not directly affect them or their interests.

It is therefore useful to involve clients in all phases of PM&E, both at the institutional and research levels. Institutions can thus facilitate the accountability of resource investment and research results to donors and sponsors while enhancing their recognition and prestige. Participation is even more important when the organization orients its activities toward end users and responds to their needs and expectations.

PM&E in research management. Directors of research centers, specialists in organizational

development, politicians, and agricultural development planners in Latin America agree that management and administrative principles and mechanisms, such as planning, monitoring, and evaluation, are important for institutional modernization.

Planning, monitoring, and evaluation are key elements in the management of research institutions, but their successful implementation greatly depends on the mechanisms and tools used.

In the future, agricultural research institutions will consider the design and adoption of PM&E methods and mechanisms as a normal part of their activities. On the other hand, resources, the size of the institution and the type of services it offers, the range of clientele, and the complexity of its activities determine the type of management and the PM&E procedures that an institution can adopt.

Methodological autonomy. The PM&E processes developed by agricultural research institutions have several weak points. The most widespread faults are the variability found in PM&E units among different institutions, the loose definition of a PM&E unit, conceptual and methodological constraints, limited qualified personnel, immediate demands from external groups, frequent changes in the institution's political environment, and the high costs of some PM&E activities. Also, institutions have a limited capacity to prepare plans, to involve users in priority setting, to anticipate changes in the socioeconomic context of the institutions, and to relate, in effective terms, the medium-term planning to annual programming and budget planning.

To improve future applications of an integrated PM&E process and to correct the most significant weaknesses mentioned above, the internal and external credibility of institutional PM&E activities must be improved. To do so, institutions need to enhance their methodological capacities, transparency, user participation, and flexibility.

Institutions need to increase their capacity and autonomy to develop their own frame of reference and to develop the PM&E methods and procedures that will satisfy institutional needs, mandates, resources and possibilities.

PM&E as a learning process. PM&E activities should be part of a permanent institutional learning

process that involves the entire organization. Institutions can nurture the ability to conduct these activities if they use their experience in learning more about PM&E and disseminate this information to others, while innovating and improving the PM&E process and its applications. Staff should be in a continuous learning process to gain experience in PM&E.

Every institution needs to develop the capacity to interpret the main needs of PM&E, and to design and develop a PM&E system that will improve institutional management.

It is important to learn from major experiences, but we should not overlook the simple experiences. For example, some institutions adopt simple, practical approaches when working directly with farmers; these approaches include the use of participatory strategies that are relevant to local circumstances. Many institutions have shown interest in incorporating these approaches into their sometimes complex approaches to field work.

Summary

This sequence presents the general concept of PM&E in research, in the light of changes occurring worldwide and the status of agricultural research in Latin America and the Caribbean. It serves as an introduction to the content of Sequence 3.

This sequence attempts to answer two questions: What implications will ongoing global changes have for institutions in general, and for agricultural research institutions in particular? What is the current conceptual, institutional, and methodological status of PM&E in the region?

To answer the first question, participants are introduced to the topic by a document on global changes that can affect national development models and therefore influence institutional paradigms. The text presents a hypothesis that relates the success and failure of institutions with the rise and fall of development models.

To answer the second question, a text summarizing the status of PM&E in the region is presented. Major aspects covered include background, importance, common elements and differences, methodological differences and experiences, challenges, and perspectives.

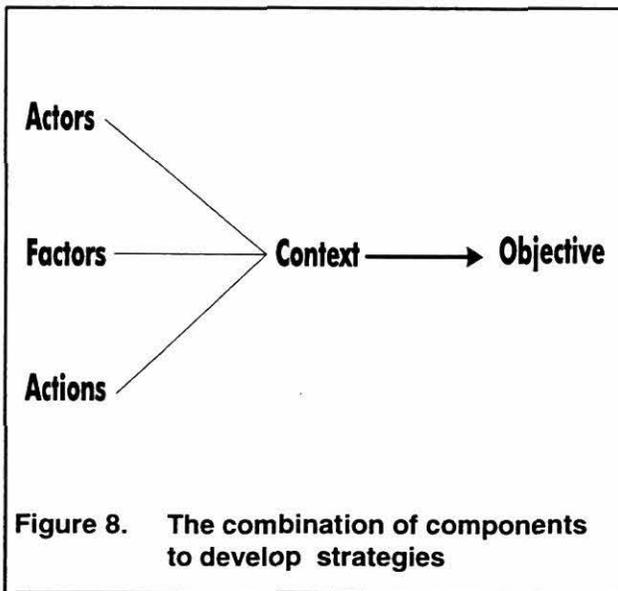
Sequence 3.

Strategies to Strengthen PM&E

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oppose, or to be **indifferent** to the objective. You must plan actions supported by different sets of arguments for each group of actors. Ideally, these groups should use a participatory methodology for motivation. Likewise, if a political decision is made to exclude opposing groups, **do not ignore their existence**. They can confuse, limit, or impede the attainment of the objective.

Factors. You should identify various available and potential factors to be included in the development of the strategy. You must recognize the relevant factors, how many there are, where they are, who controls them, who knows how to use them, when to use them, and what internal limitations to their use exist.



Actions. A strategy needs a number of specific initiatives so that its different components can be implemented. Always plan these actions in connection with the other elements of the strategy.

The context. Every objective exists within a context. **Its achievement depends on the conditions within the context.** Since it's impossible to identify all the conditions, you must find the most significant ones and incorporate them in the strategy development. The conditions that make up the context can be more or less favorable achieving the objective. Thus, the **perception of the context** is important in guiding the development of the strategy.

Methodology

One way or another, we are always developing and conducting strategies. Generally we do this unconsciously and unsystematically. Unfortunately, there is no fixed method or magic way to develop strategies.

This is one of the reasons that explain the lack of agreement among "strategists" about the best definition of a strategy. Famous strategists agree that **the objective** to be achieved is the most important reference point for defining the logical steps to follow. This gives **the most intelligent combination** of actors, factors, and actions for the strategy.

Developing a strategy entails uncertainty; it requires intensive use of information, intelligence, and creativity.

This has three implications: *first*, an infinite number of possibilities exist for achieving an objective, and thus, for **alternative strategies**; *second*, when different institutions in different contexts pursue the same objective, they will no doubt use different strategies, although some of them may be very similar; *third*, there is always more than one combination of actors, factors, and actions to achieve an objective, so selection of a strategy is always the result of a **political decision**.

By "logical combination" or "intelligent combination", we mean one that is the most appropriate, timely, and has the best combination of possible actors, factors, and actions to achieve an objective in a given context

In this context, the only methodological reference to develop strategies is the objective to be obtained. The rest of the process is an intensive activity incorporating intelligence, information, and creativity.

How can an objective contribute to the strategy development? The first and most decisive step in developing a strategy is to discuss and clearly define the desired objective.

Poorly defined objectives have led to the failure of many strategies. Poor objective formulation makes it difficult to perceive the context, the most relevant factors to be used, the most critical limitations to be overcome, or the most strategic actors to be considered.

In defining the objective of a strategy eleven questions must be answered (Table 5).

General considerations

Generally, a strategy suggests change; initiating a strategy means recognizing its value among other alternatives, and the possibility of its success.

Those who plan and implement a strategy must be motivated to act strategically toward achieving the desired objective. Lack of precision in defining the objective and lack of commitment of the decision makers have caused many strategies to fail.

Table 5. Questions that must be answered when defining objectives

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

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

Summary

This sequence offers conceptual and methodological guidelines for developing strategies. These can be used to strengthen management including PM&E.

This sequence begins by establishing what a strategy is, and what it needs to be considered successful. It emphasizes the importance of a “strategic intention,” the acceptance of an explicit commitment and direct participation. These are basic attitudes for those who want to achieve an objective and have the authority to do so.

After presenting these basic ideas, the sequence presents four basic elements to consider in the definition of a strategy and its objective: the actors, the factors, the actions, and the institutional context. A diagram shows the proper combination of these elements to develop a strategy.

Some methodological issues for development of strategies are presented in the second part of the sequence, especially the importance of defining the objectives correctly. The importance of the objectives as motivation and a source of inspiration in strategy development is analyzed briefly. A table shows eleven basic questions and their justification to incite thought in the essential factors to keep in mind when defining an objective.

This is the final sequence of Module 1. The participants are ready for the following modules. They will delve deeper into the fundamentals of strategic planning, monitoring, and evaluation in agricultural research institutions. They will select the methodological tools for managing these activities. These activities should be considered from a strategic approach, and practiced as part of an integral process.

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Appendix 1. Terms Used in the PM&E Manuals

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

Accountability

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

Assumption

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

Beneficiaries

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

CIPP evaluation model

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

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

Intended to interpret the work and merit of an activity's final outcomes in relation to the needs of the group it is intended to serve.

Clients

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

Criteria

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

Decision-making level

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

Effectiveness

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

Efficiency

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

Evaluation

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

Ex ante evaluation

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

Expert review

(See *peer review*.)

Ex post evaluation

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

External analysis

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

External environment

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

External review

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

External validation

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

Formative evaluation

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

Gap analysis

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

Goal

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

Impact

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

Input

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

Institutional sustainability

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

Institutionalization

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

Internal review

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

Logical framework

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

Means of verification

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

Metaevaluation

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

Mission

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

Objective

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

Objectively verifiable indicator

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

Ongoing evaluation

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

Operational planning

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

Organizational analysis

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

Output

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

Participatory management

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

Peer review

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

Planning

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

Policies

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

Products

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

Program

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

Programming levels

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

Project

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

Project cycle

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

Project management

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

Purpose

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

Quality control

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

Relevance

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

Scenario

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

Stakeholders

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

Strategic planning

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

Strategy

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

Summative evaluation

A summary statement about the accomplishments,

effectiveness, value, and impact of programs. Summative evaluations are made for accountability purposes and for policy-making.

Survey

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

Tactical planning

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

Appendix 2. Strategies for Solving Complex Problems

All institutions frequently face problems. Institutions generally do not have a systematic method for solving such problems, which may have serious implications for institutional development, and for the quantity and quality of its products or services. Without systematic methods, institutions waste time, talent, and financial resources while looking for solutions that are not necessary the most appropriate.

The search for solutions to complex problems can be organized in different ways. We will present two strategies, each with a participatory component.

Eight-step strategy

The eight-step strategy (Figure A1.1), requires the participation of different groups of actors involved in the problem to be solved. These groups answer the following questions for each step:

- What is the problem?
- What do we know about the problem?
- What caused the problem?
- What can be done?
- What is the best solution?
- How can we implement the solution?
- Was the problem resolved?
- Can we improve on what was done?

Five-stage strategy

The five-stage strategy for solving complex problems is a variation of the eight-step strategy, and combines the elements in a different way. Here, the groups complete five stages, which include: proposal, analysis and planning; education and communication; operational plan; and implementation and evaluation of the results. Figure A1.2 shows the five stages with the corresponding eight steps.

Strategy Implementation

In practice, a group of no more than three people should coordinate the activities and distribute copies of Figures A9.1 and A9.2, to each of the groups involved in the solution of the problem. Ask them to answer the questions, as fully as possible, and in the order shown in the Figure. After about 3

to 5 days, each group presents both an oral and written analysis of the problem, its original cause, possible solutions, how to implement solutions, and how to recognize if the problem has been solved.

The coordinating group will consider criticisms and suggestions once the groups have presented their opinions. It will study all the choices and present an oral and written summary to the top management of the institute. Management will study this summary, and announce and explain its final decision to those participating in the problem-solving process.

The explanation by the management is one of the most important aspects of this strategy. Without it, participants may refuse to get involved in another problem-solving process; in which case the institution will lose the creative potential of its human resources for solving relevant problems.

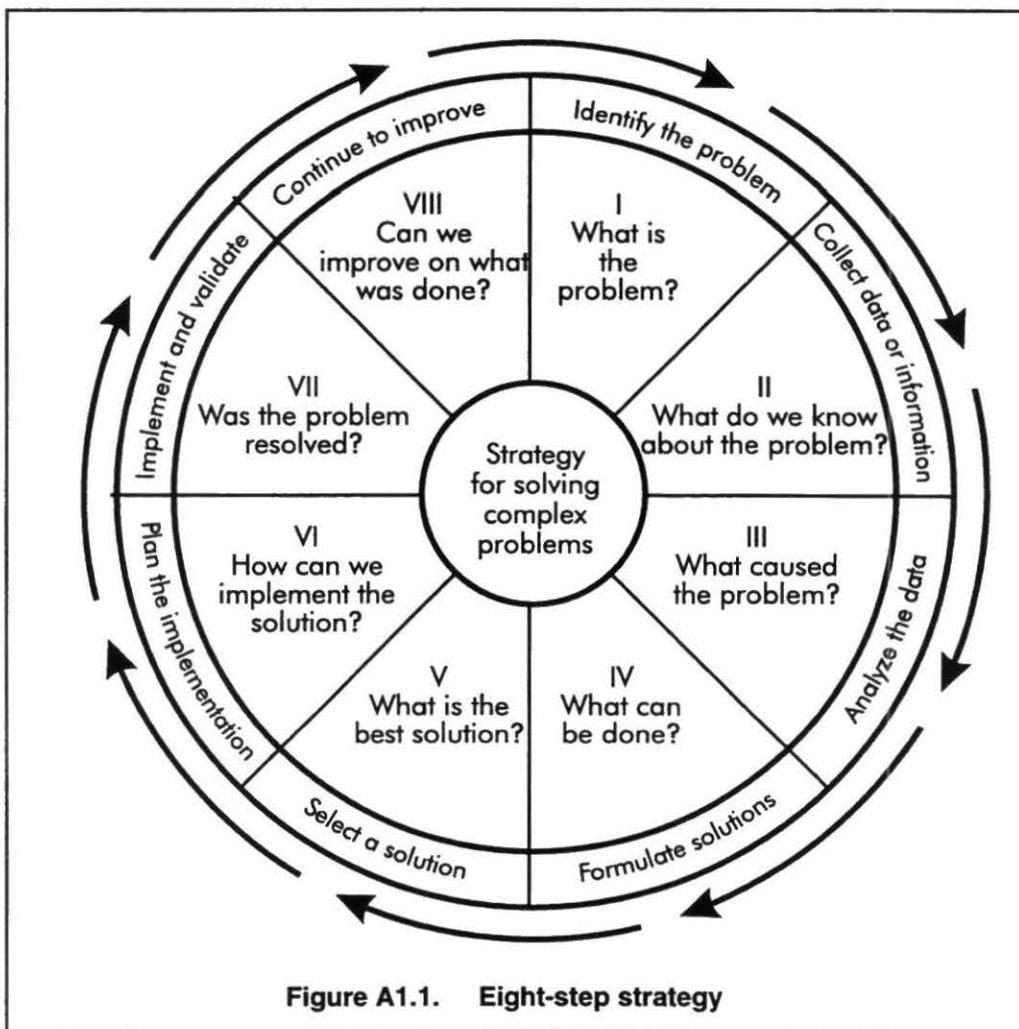
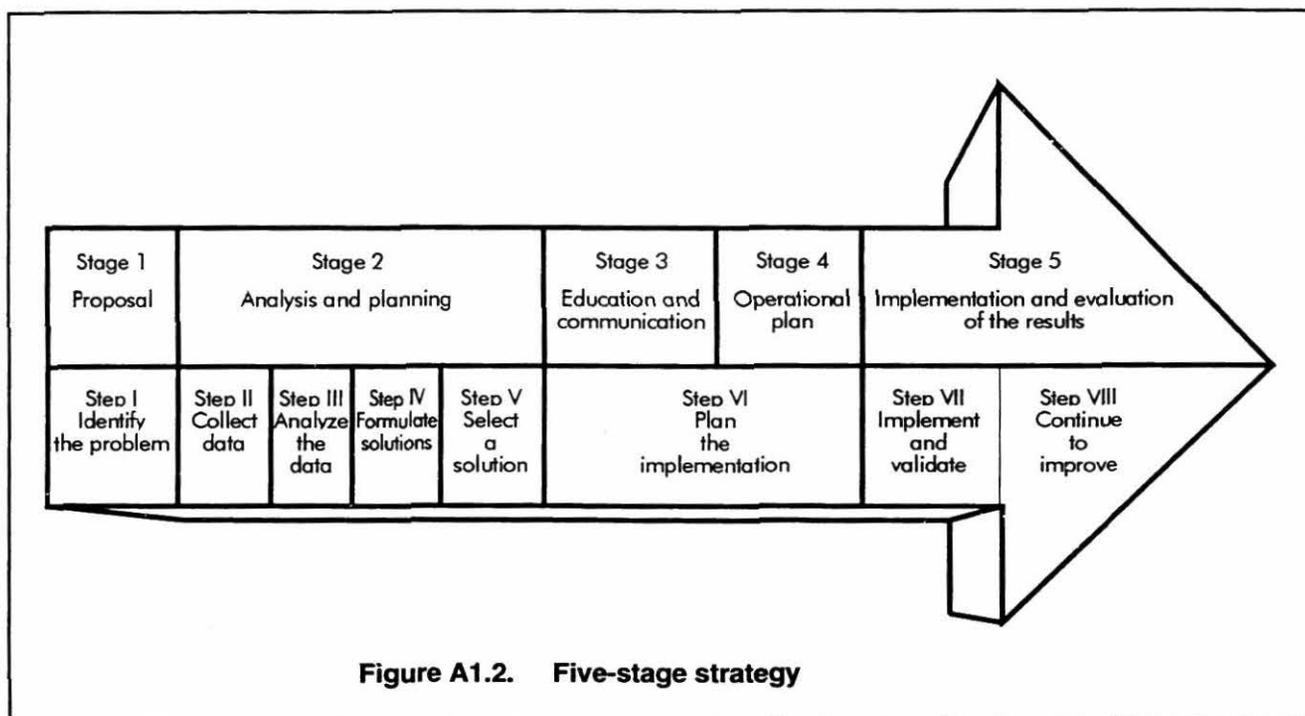


Figure A1.1. Eight-step strategy



Appendix 3. Bibliography

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