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Monitoring and evaluation of agricultural research

The Hague, November 12-14, 1990



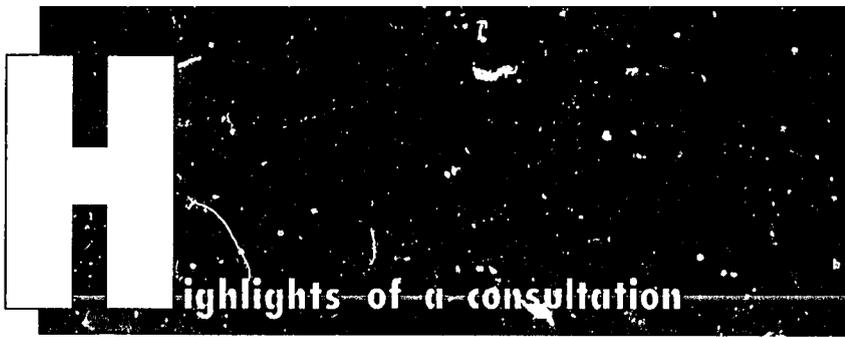
The International Service for National Agricultural Research (ISNAR) began operating at its headquarters in The Hague, the Netherlands, on September 1, 1980. It was established by the Consultative Group on International Agricultural Research (CGIAR), on the basis of recommendations from an international task force, for the purpose of assisting governments of developing countries to strengthen their agricultural research. It is a nonprofit autonomous agency, international in character, and nonpolitical in management, staffing, and operations.

Of the 16 centers in the CGIAR network, ISNAR is the only one that focuses primarily on national agricultural research issues. It provides advice to governments, upon request, on research policy, organization, and management issues, thus complementing the activities of other assistance agencies.

ISNAR has active advisory service, research, and training programs.

ISNAR is supported by a number of the members of CGIAR, an informal group of donors that includes countries, development banks, international organizations, and foundations.

Cover design: Taken together, monitoring and evaluation of agricultural research form a continuum of critical assessment of resources, activities, and results.



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ISNAR

INTERNATIONAL SERVICE FOR NATIONAL AGRICULTURAL RESEARCH

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AGROVOC Descriptors

evaluation; research; monitoring; management; research institutions; public research

CABI Descriptors

agricultural research, government research; management, research institutes; evaluation; monitoring

Introduction: Why a consultation on M&E?

Monitoring and evaluation (M&E) are essential management functions but they pose special problems in the national agricultural research systems (NARS) of developing countries. Little systematic work has been done to assess current M&E practices in NARS, to identify the major barriers to monitoring and evaluating agricultural research, or to establish guidelines for national and international work in this area.

ISNAR is intensifying its work in the area of M&E of agricultural research. To obtain first-hand information on NARS work in M&E and to involve NARS leaders in planning ISNAR's activities, a three-day "Consultation on M&E of Agricultural Research" was held in The Hague from November 12 to 14, 1990. This document presents a summary of the meeting's discussions, conclusions, and recommendations, as well as highlights (under each author's name) of the papers presented. ISNAR accepts responsibility for any misinterpretations of the ideas presented at the consultation.

A small group of seasoned agricultural research managers from developing countries was invited by ISNAR to share their knowledge and experience at the consultation. Other participants were the Director of Planning and Evaluation of the International Development Research Centre (IDRC), the Head of Research Coordination and Planning at Shell International, and members of ISNAR's Working Group on Monitoring and Evaluation. The names and positions of invited participants and ISNAR staff can be found at the end of this report.

During the meeting, brief papers were presented to stimulate discussion, exchange of information, debate on key issues, and assessment of options for improving M&E in NARS. Rapporteurs summarized the issues and conclusions of each session, and a writing panel prepared an overall summary and conclusions.

IDRC and the United Nations Development Program (UNDP) provided financial support for the consultation.

Summary and conclusions of the consultation

I. Objectives of the meeting

In this three-day meeting, ISNAR consulted a number of research leaders from developing countries on the state of monitoring and evaluation (M&E) efforts in their national agricultural research systems (NARS) and on their needs in this area of management.

Specific objectives were to:

- review the state of M&E in NARS and provide examples from both NARS and the private sector;
- identify technical and institutional constraints on M&E;
- suggest M&E priorities and guidelines for NARS;
- suggest areas where ISNAR and other international agencies can assist NARS with M&E work.

II. Definitions of M&E

M&E is a continuum of critical assessment of resources, activities, and results. Monitoring tends to be a continuous process; evaluation a periodic or one-time activity with a greater degree of critical assessment. More work is needed to establish clear definitions that are appropriate for agricultural research.

M&E can be carried out at various levels within a research system and at different stages in the life cycle of the activities under scrutiny.

In the context of research programs and projects, different types of evaluative activities are needed in the three major stages of the management cycle:

- *ex ante* evaluation (at the planning stage), to set priorities and maximize the chances of a successful outcome;
- monitoring or on-going evaluation during implementation, to warn managers of deviations from what was originally planned and to identify new opportunities that may merit attention;
- *ex post* evaluation (after implementation), for purposes of accountability, to measure impact, and to learn lessons that can improve future planning.

M&E can be carried out at three different levels within an agricultural research system: system level, institute level, program or project level.

The users and uses of evaluative information differ between the levels. While managers of projects and programs need detailed technical information on research procedures, institute directors and policymakers need more highly synthesized information that highlights the social and economic impacts of research.

Participants at the consultation chose the project/program level as the focus for discussion. This reflected their managerial level and interests. This is also the level at which most M&E work takes place. (Project- and program-level M&E initiatives are executed on a shorter cycle than M&E at higher organizational levels.)

III. M&E in NARS

More M&E is done in national agricultural research systems than is generally believed. However, it is poorly documented and understood, and the use of its results in planning and management appears to be limited.

Frequently used formal M&E mechanisms are mainly for reporting and accountability to donors and governments. These include project reports, financial reports and audits, and reports to donors.

Rigorous economic studies (*ex ante* or *ex post* evaluations, rate-of-return studies, and impact assessments) are done in relatively few NARS.

The degree of institutionalization of M&E varies widely across the national research systems. In some, particularly the older and longer-established ones, M&E is well established. However, since M&E systems and experiences have seldom been documented or analyzed, learning from them will require systematic research. In most NARS, M&E is mainly informal and still needs to be institutionalized.

IV. Problems of M&E in agricultural research

Participants in the consultation noted that the level of development varies among NARS, and with it the problems associated with M&E. The following general trends were thought to apply in many cases:

- The use of M&E results for program management is often limited. This applies to the following specific functions: charting progress against proposed timetables, quality control, resource allocation, public awareness, guiding or fine-tuning projects or programs during implementation, and improving technology generation and transfer through farmer feedback.
- In many cases, program and project goals are not clear enough to provide useful criteria for monitoring or evaluation.

- Structural problems that may hamper M&E include: lack of clearly defined authority and responsibility for projects and programs; no clear assignment of responsibilities for M&E; and poor integration of management processes for planning, evaluation, and resource allocation.
- NARS have severely limited resources for M&E. This needs to be remedied through training, additional resources (including, in some cases, formally trained evaluators), and access to proven M&E mechanisms and methods.

V. NARS priorities for improvement

Efforts to improve monitoring and evaluation should focus on improving the management of research programs. Special care should be taken to avoid spending excessive time and energy on paperwork and reporting.

M&E needs to be institutionalized in NARS. A minimum of formal M&E is needed to ensure good management and accountability to the sponsors of research. However, in establishing M&E procedures, care is needed to provide researchers with needed incentives and flexibility for creative scientific work.

M&E needs to be integrated with planning. Plans should contain clear goals and criteria for M&E. Evaluation reports should present concrete suggestions that can be used to improve future planning and implementation.

Simple, practical M&E methods and processes are needed. These include general guidelines and criteria for M&E, feedback mechanisms for management (e.g., timely reporting), and means to ensure participation of farmers and other users in research evaluation.

M&E instruments are needed to incorporate M&E considerations into Management Information Systems (e.g., M&E fields in the computer data base). Standard formats are needed for project proposals, progress reports, etc. Simple tools are essential for gathering, analyzing, and reporting M&E information (both qualitative and quantitative).

Improving M&E will require two types of training. The first is skill-oriented training in practical M&E methods. The second is broad management training to create an evaluation "culture" (awareness of the value of M&E) and to provide general management skills such as the ability to prepare plans or project proposals. (M&E starts with a clear statement of a project's objectives and criteria of evaluation.)

In many cases, structural reforms will be needed to strengthen the link between resource allocation and program performance, or to assign clear responsibilities for M&E within the management structure.

VI. What ISNAR should do

NARS are impatient with needs-assessment exercises; they seek immediate practical solutions. Six priority areas were identified:

1. Assistance with planning and organizing M&E:
 - diagnosis of M&E needs, including structural requirements;
 - planning of M&E systems;
2. Simple, timely and appropriate M&E methods and procedures for:
 - program and project planning;
 - preparation of proposals;
 - monitoring of progress against milestones;
 - evaluation of results;
 - information gathering, processing, and storage;
 - report preparation;
 - dissemination and use of evaluative information.
3. Assistance in implementing improvements in M&E (including use of NARS expertise) through:
 - follow-up missions;
 - sustained technical assistance;
 - 'alarm clock' effect (an ISNAR visit can precipitate consolidation of efforts);
4. Exchange of information on M&E:
 - ISNAR should act as an international clearing house and catalyst for dialogue on M&E (involving NARS, universities, foundations, development agencies, etc.).
 - ISNAR should help NARS to benefit from experiences in other NARS and other sectors.
5. Training is needed at all levels in the NARS to stimulate awareness and support and to improve M&E skills.
6. Additional funding is needed for all aspects of M&E improvement, especially for training and implementation of changes.

An update on ISNAR'S work in monitoring and evaluation

Peter R. Goldsworthy

Taken together, monitoring and evaluation are one of the 12 factors identified in ISNAR's strategy as critical to the effectiveness and efficiency of national agricultural research systems.

Reviews of research systems and of institutes are a form of evaluation that has featured prominently in ISNAR work from the outset. ISNAR has prepared guidelines for the conduct of reviews (Murphy 1985a). More recently, two other accounts have been produced. The first, a framework for system-level reviews, sets out an approach for use by ISNAR teams and others (Dagg and Eyzaguirre 1989). The second, a checklist approach, is intended to help NARS to conduct their own reviews of agricultural research institutes (Nestel 1989).

M&E concepts

The basic principles of M&E of research, as well as some techniques for project management, have been set out in working papers by Murphy (1985b) and McLean (1988a, b, c). Variants of the "logical framework" used by USAID, GTZ, and many other development agencies for project planning and evaluation feature prominently in these papers and they have been used by several NARS.

Literature review

Since 1980 ISNAR has assembled a large collection of documents on M&E. A list of selected references with abstracts was prepared in 1988. A much more detailed study of the literature is under way and a progress report is included in these "Highlights".

Training courses and workshops

M&E has been included in a number of ISNAR training courses and workshops on general agricultural research management. Staff have also participated in specialized workshops on this topic in Bangladesh (1984), Singapore (1986), Colombia (1988), Argentina (1988), and Chile (1989). In 1988, ISNAR and Rutgers University organized an international workshop on methods to assess the constraints on, and impact of, agricultural research systems. The proceedings were published in two volumes (Echeverría 1990).

General assessment

The work to date, though limited, has helped to clarify M&E concepts and terms, and to assess their potential application in NARS. There is an important gap, however, in knowledge of how M&E is being used, or could be used, in NARS as an aid to research management. Our knowledge of M&E of agricultural research in developing countries is limited. There has been no systematic assessment of NARS' needs, and while many individuals know the strengths and the weaknesses of M&E systems and procedures in their own organizations, few know how M&E is carried out elsewhere in their own country or abroad. It is therefore not surprising to find little practical expertise in the design and implementation of M&E systems for agricultural research.

Experience today indicates that little can be usefully transferred directly from developed-country experience to NARS. A special effort is required to collaborate with NARS in the design of appropriate M&E systems. The first step for a NARS should be to define its needs for evaluative information. A close link needs to be established between planning and M&E; evaluation should begin at the program design stage, with the setting of clear objectives and the selection of specific measures of achievement.

Plans for the future

ISNAR has an established knowledge of NARS and frequent contacts with NARS managers. These give ISNAR a unique ability to assess NARS' needs and to develop a practically oriented program of research, advisory service, and training in specific areas of research management, including M&E.

Subject to the discussions at this meeting, ISNAR proposes to focus its work on M&E on two main areas. The first is a detailed analysis of the existing situation and an assessment of what NARS see as their needs and priorities in relation to M&E. This will be done by means of surveys, case studies, and workshops. (This M&E meeting is an important step in that process.)

Second, and subject to the results of the needs assessment, ISNAR will seek opportunities to develop and test, in collaboration with NARS, M&E techniques and systems appropriate to their management needs and available resources. In the process, ISNAR will establish closer links with organizations working with NARS and will seek ways of integrating work on M&E with related areas of research such as planning, priority setting, program formulation, and management information systems. ISNAR will also attempt to ensure that this M&E work complements its advisory service, research, and training activities on these interrelated topics.

Peter R. Goldsworthy is a Senior Research Officer at ISNAR.

Lessons from previous M&E dialogues organized by IDRC

Douglas Daniels

National agricultural research managers have discussed the state of evaluation in their programs in two previous workshops sponsored by IDRC. Papers presented at a 1986 meeting in Singapore (Daniels 1987) reviewed national experiences in 17 countries. A 1988 meeting in Colombia brought together participants from 23 countries in Latin America and the Caribbean (Novoa 1989).

The workshop discussions indicated that more evaluation is being done than generally realized and that interest in evaluation is growing. This is partly due to growing interest in research management. Evaluation can also help increase support for NARS by demonstrating the benefit of research.

Workshop participants were generally disappointed with the level, quality, and usefulness of evaluation, which they saw as possibly the weakest function of their management systems.

It was noted that some cases of well-institutionalized M&E can be found, for example, in Brazil, Colombia, India, and the Philippines. Generally, the most organized evaluation systems are in the strongest research programs with the greatest institutional stability.

In many countries, most evaluation is donor-driven. Participants recommended that donor agencies improve the usefulness of external evaluations to national programs. One key principle mentioned was that national managers are responsible for all aspects of their research programs, including evaluation. And donor agencies should respect this principle.

Four major points

I would like to highlight four broad areas of consensus that emerged during these meetings. The first area of agreement was that evaluation is a **valuable management tool**, which managers must take control of and use to their own advantage. Some participants at the first meeting arrived thinking that evaluation was a complex subject outside their own day-to-day management responsibilities and best left to specialists. By the end of the meeting, these same participants were searching for ways to make evaluation serve their own interests. Behind most of these discussions was the perceived need to develop

a strategy — a sense of what one wants to evaluate and why; the 'how' then follows as a secondary issue.

The second major area of consensus was the importance of **ensuring full use of evaluation results**. A number of factors limiting utilization were identified, including lack of clear research objectives, weaknesses in evaluation methodologies, unimpressive or contentious results, and an unreceptive climate for evaluation in research institutions. While these constraints will not be easily overcome, managers were unanimous in saying they had to be addressed and the results of evaluation disseminated and used.

The third area of consensus was on the potential **value of measuring research benefits and impact**. Most discussion focused on studies of economic returns to research, many of which have been carried out. One problem is that these are often disseminated more widely internationally than in the country concerned. It was also pointed out that these studies often have limited value to managers; they are mainly for generating public support.

A fourth area of consensus concerned **resource constraints on evaluation**. National systems have severely limited funding and human resources, of which only a small proportion can be devoted to evaluation. Given the present state of the art, what are the areas of highest payoff and what are the inherent limitations? Good evaluation is costly in terms of the time and energy of managers and researchers needed to select evaluation issues, define terms of reference, monitor evaluations, and digest and use the results.

During the discussions it was noted that evaluations are usually conducted after the fact (*ex post*). Hence, they are better at telling us how to improve research the next time round (i.e., increase efficiency) rather than what research to do in the first place (i.e., improve effectiveness). While there is little evidence on the use of evaluation information in planning, it seems that broad, system-wide reviews have had the greatest impact. (Many national programs and institutions have been created as a result of such reviews.)

Need for a consultative process

I would like to conclude by returning to the idea behind the consultative process followed in these meetings. Is it necessary to look to national experiences and build evaluation guidelines on this basis, or can one lay out an ideal system now? It seems clear that it would be unproductive to try to design such a system in isolation from national experience. Differences in national capabilities, interests, resources, culture, and organization require different approaches.

Hard evidence of what approaches and techniques work best is very limited. So we must proceed with caution. There can be no cookbook or uniform model at this stage. Careful examination of methodologies, processes, and types of evaluation is needed to encourage the development of evaluation as a discipline in its own right. I believe that this iterative process, which requires more research as well as an ongoing dialogue among national managers (which

ISNAR and others are encouraging), will lead to major changes in the way we do, use, and benefit from evaluation over the next five to 10 years.

Douglas Daniels is Director, Office of Planning and Evaluation, International Development Research Centre, Ottawa. The views expressed are his and do not necessarily represent those of IDRC.

The many faces of M&E: A progress report on the literature

Douglas Horton, Peter Ballantyne, and Beatriz Uribe

ISNAR wants to develop a firm basis for its training and advisory services in the area of monitoring and evaluation. It is therefore reviewing the literature on the subject and building a bibliographic data base on M&E of agricultural research in developing countries. This work is supported by a grant from Canada's IDRC.

The library holdings of ISNAR have been screened and supplemented with additional references provided by numerous national and international organizations and by evaluation experts. A classification scheme for M&E documents has been devised. This includes several characteristics:

- type of document (evaluation report, synthesis, collection of studies);
- language (English, French, Spanish);
- origin (publisher and country);
- content (subject matter, geographical scope, methodology, and management function);
- degree of specialist knowledge needed to understand the methods presented in the document and interpret the results.

Of 14,000 documents screened, 1360 have been identified as M&E documents, of which 317 are concerned with developing-country NARS. Here are some of the key findings to date:

- There is no consensus on M&E definitions and concepts as they relate to agricultural research.
- Most of the M&E documents related to agricultural research in developing countries may be considered as "grey literature," issued by development agencies, CGIAR centers, NARS and universities (Table 1). These materials are generally inaccessible to NARS managers and evaluation specialists, since they are not commercially published and are seldom found in libraries.
- Few general conclusions or methodological lessons have been extracted from the many evaluations of donor-supported agricultural research and

extension projects. This is reflected in the relatively small number of synthesis publications and training materials (Table 2).

- The documents available contain little information on the M&E procedures currently used in NARS.
- Economics has contributed many useful evaluation concepts and methods, but agricultural research has benefitted little from work in the broader field of evaluation or from experiences in other sectors, such as health and education, or in the private sector.

Douglas Horion is a Senior Research Officer at ISNAR. Peter Ballantyne is ISNAR's Librarian. Beatriz Uribe is a consultant to the ISNAR M&E literature review.

Table 1: Source of Evaluation Documents

Publisher	Number
Journal articles	21
Commercially published books	
Developing countries	4
Developed countries	9
Grey literature¹	
Development agencies	101
CG Centers	72
NARS and universities	
Developing countries	79
Developed countries	31
Total	317

Note: Includes documents in ISNAR library on national-level agricultural research in developing countries.

Table 2: Type of Evaluation Document

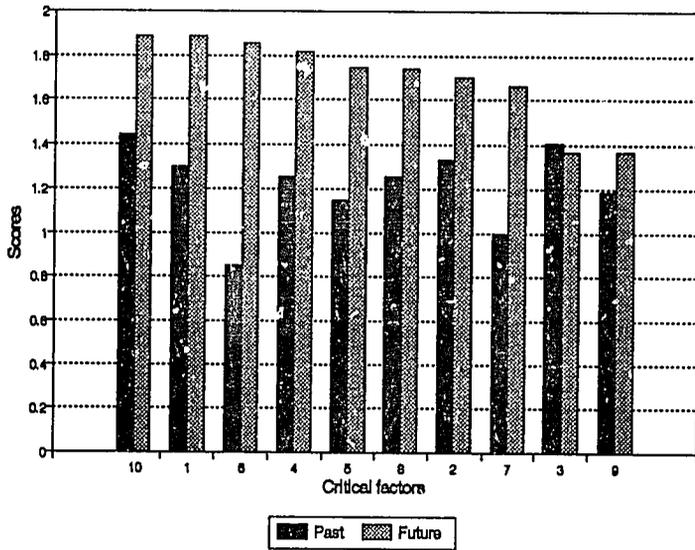
Type	Number
Evaluation reports	197
Synthesis of evaluations	14
Descriptions of M&E	32
Studies of M&E	16
Methodologies	22
Guidelines	4
Training materials	0
Bibliographies	0
General/other	32
Total	317

Note: See Table 1.

NARS leaders' views on M&E

Robert Raab and Dely Gapasin

In view of the limited documentation on M&E, ISNAR surveyed national agricultural research leaders who attended the "International Agriculture Research Management Workshop" in The Hague in October 1990. NARS leaders generally view M&E as a second- or third-generation problem — that is, one that needs attention only after research has been planned and is being carried out. This is reflected in the survey results. According to 27 NARS leaders attending the workshop, they have, to date, put less emphasis on M&E than on any other aspect of research management. At the same time, they say they expect M&E to become one of the most important aspects of research management in the future (see Figure 1).



- | | |
|--|------------------------------------|
| 1. Interaction with development policy | 6. Monitoring and evaluation |
| 2. Planning and priority setting | 7. Information management |
| 3. Structure and organization | 8. Human resources management |
| 4. Linkages with technology transfer and farmers | 9. Physical resources management |
| 5. Program formulation and budgeting | 10. Financial resources management |

Figure 1: Past and Future Emphasis on 10 Aspects of Research Management

Numerous M&E mechanisms are used in NARS — more than generally is assumed. However, these serve primarily to generate reports for research

sponsors on resources used and on activities carried out, rather than to provide information useful for research management.

Virtually all the organizations covered by the survey maintain inventories of assets and file periodic reports to domestic and foreign sources of funds. Most also issue institute-level reports and routinely prepare project outlines, individual work plans, and personnel evaluations. About half the organizations reportedly have strategic plans as well as planning or evaluation units. However, relatively few have carried out economic evaluations or impact studies (see Figure 2).

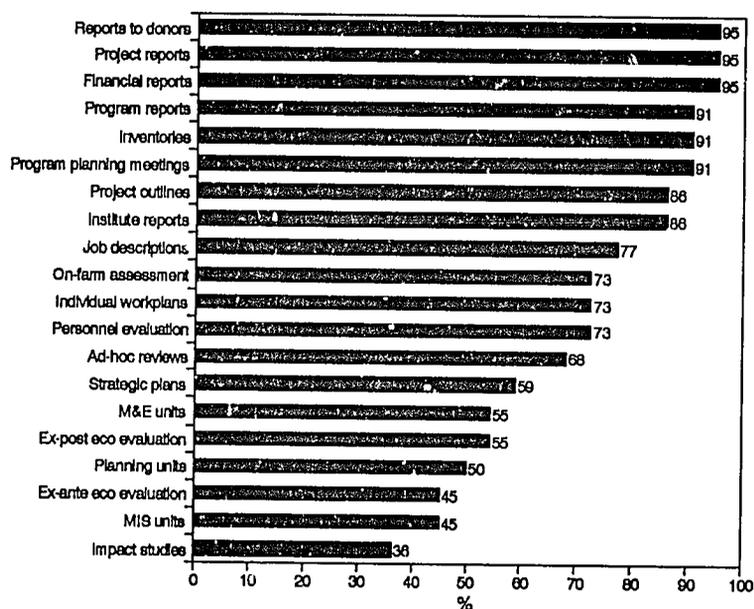


Figure 2: Percent of NARS that Use Different M&E Mechanisms

When asked about the relative importance of the various M&E mechanisms for research management, NARS leaders put planning and periodic reporting at the top of their list, and economic evaluation, impact studies, and *ad hoc* reviews at the bottom.

These survey findings support the conclusion of previous workshops: NARS leaders are concerned primarily with practical means of improving the planning and implementation of research. They are not as interested in more rigorous but costly economics studies which they perceive to have little direct use in research management (Daniels 1987; Novoa, 1989).

Robert Raab is a Research Associate at ISNAR. Dely Gapasin is a Senior Research Fellow at ISNAR.

M&E case 1: Shell International

Louis R.K. Paul

The Royal Dutch Shell Group is number two on the Fortune 500 list of the world's largest companies. In 1990, its sales were US\$116 billion. Shell is highly decentralized with more than 100 companies operating in over 100 countries. The group's business activities include oil, gas, chemicals, nonferrous metals, coal, forestry, and biotechnology. With an annual R&D budget of US\$850 million, Shell is one of the world's largest science-based corporations.

Shell International is composed of a number of "business sectors" engaged in petroleum exploration, production, oil, gas and chemicals processing, and marketing. Serving their R&D needs is the corporation's research establishment, "Shell Internationale Research Mij B.V.," one of eight service companies located in its central offices in The Hague. SIRM, in turn, manages eight central laboratories (4400 scientific staff) located in Europe and can call upon seven other operating company laboratories (located in the U.S.A, Canada, Japan, India, and Australia) to supplement its research and development resources. Research at Shell is intended to enhance the competitive position of the business sectors and is commissioned and paid for by the business sectors. The framework for commissioning and managing R&D is the "customer-contractor" relationship between individual business sectors (customers) and the research establishments (contractors).

Shell views research as a means of producing new processes, techniques, and products of commercial value and of enlarging the resources of the business sectors with new technologies and skills. It conducts four types of R&D activities:

- *knowledge-oriented basic research*, for generating new knowledge of physical phenomena, but without reference to specific areas of application;
- *mission-oriented basic research*, that is, with reference to a particular area of application;
- *applied research*, whereby scientists identify ways to harness basic knowledge of physical phenomena to solve practical problems;
- *development*, whereby scientific or technical knowledge is used to produce new or improved materials, devices, products, processes, systems, or techniques.

Within Shell, the ultimate customers for research are operating companies within the business sectors. Development-oriented work helps maintain the

competitive position of these companies in the short term. In contrast, basic research aims to keep Shell ahead of the competition over the long term.

Based on their respective business strategies, the operating companies issue R&D "guidelines" that identify problems or opportunities requiring research. Shell's 15 research laboratories, are invited to respond to the guidelines with project proposals relevant to the guidelines and to the financial outlays proposed. Representatives of research customers and contractors meet at a biennial conference to review and finalize R&D guidelines.

Once projects get under way, the system of monitoring and evaluation of research is a formal one. It is worth noting, however, that evaluation procedures, especially those for selecting research projects, have been streamlined over the years to eliminate mindless number crunching and unnecessary and overly complex quantitative analysis of the likely outcome and benefits of research. Shell strives to find a balance between bureaucratic procedures and speed of action. Hence, our system is not perfect, but it works.

The programming cycle for R&D at Shell International is biennial. Evaluation starts with program and project selection. Each business sector establishes its own list of criteria for evaluating proposed projects, with the goal of establishing a sectoral R&D program with a good balance between basic, applied, and development-oriented work. All criteria are directly or indirectly related to the sector's competitive advantage.

Project proposals, outlined in standardized forms, are reviewed by panels composed of customers' and contractors' representatives. They examine the proposals in light of the guidelines and approved R&D themes. Criteria for project selection include:

- relevance to business goals;
- business category (to maintain, extend, or "step out" into new areas);
- expected time to utilization of results;
- feasibility and probability of success;
- expected costs and benefits;
- overall R&D program balance.

Once the two-year program blocks of R&D projects have been composed, endorsed, and initiated, progress is monitored periodically against budgets, technical standards, and previously identified project milestones. Progress is typically monitored through quarterly progress reports. If needed, meetings are held or visits are made to research facilities. These are attended by technical representatives from the sector and research project leaders. At the end of each biennial program cycle, a formal evaluation is carried out which includes an in-depth review of each project.

In the past, computer programs were used to weigh criteria and arrive at overall scores for project selection and for final evaluation. Gradually, these evaluations have become more qualitative in their approach.

Louis Paul was formerly Head of Research Coordination and Planning at Shell International, Research Mij B.V., based in The Hague.

M&E case 2: The Philippines

Dely Gapasin, Beatriz del Rosario, Maruja Lorica, and Bessie Burgos

The apex of the Philippine agricultural and natural resources research and development system is PCARRD — the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development. Founded in 1972, it has a multifaceted mandate:

- to define the goals, purposes, and scope of research in agriculture, forestry, and natural resources;
- to formulate the national research and development program;
- to establish a system for setting priorities, allocating resources, assessing, and updating the national research and development program;
- to document and disseminate research outputs;
- to coordinate research at the national level;
- to establish and manage linkages to various stakeholders of research, both local and international.

Agricultural and natural resources research is carried out by 11 national centers, 20 regional centers, 67 cooperating stations, and eight specialized agencies. These research centers and stations are organized into 14 regional research and development consortia. Research coordination in the network of research centers and stations is carried out by these consortia at the regional level and by PCARRD at the national level.

Since its establishment, PCARRD has had the authority to review all research proposals and to recommend to the government the national research and development program and budget.

M&E mechanisms include *ex ante* assessment of projects, monitoring of on-going projects, and *ex post* evaluation. The potential impact and economic benefits to users are also assessed. Although not discussed here, informal mechanisms, such as personal contact between scientists, are very important and should not be discounted.

Ex ante evaluation

Ex ante evaluation is the review of research proposals submitted to PCARRD by all the members of the national research and development network. Whether intended for local or external funding, all agricultural research projects are examined. *Ex ante* evaluation includes technical appraisal of research proposals by commodity teams in the regional consortia and in PCARRD. Proposals are evaluated according to several criteria:

- likely contribution to agricultural development;
- relevance to national and regional needs and priorities;
- focus on priority research areas;
- lack of duplication of other projects;
- soundness of proposed methodology;
- extent to which the estimated budget matches the scope of the proposed work;
- availability and capability of researchers.

Once the research proposals have been appraised, the PCARRD Secretariat packages the national research and development program and budget. The Governing Council of PCARRD approves and endorses the national program and budget to the Department of Budget and Management for fund allocation and release. The official endorsement of the total science and technology budget, including agricultural and natural resources research, is given by the Secretary of the Department of Science and Technology.

Monitoring of on-going projects

Monitoring is the appraisal of projects during implementation. In the Philippines, it is done annually throughout the research system. Six mechanisms are used: field evaluation, in-house review by each agency, coordinated review of on-going and completed projects at the regional level, a regional symposium to discuss research and development highlights, semiannual and annual technical and financial reporting, and technical seminars to discuss research results. PCARRD has established several computerized databases for monitoring and evaluating projects.

While having their own specific objectives, these mechanisms are generally aimed at:

- determining progress and the extent to which objectives have been achieved;
- identifying the status of technologies or information generated or verified to date;

- assessing the appropriateness of the methodology;
- determining the efficiency of the use of resources (budget, scientists' time);
- identifying problems in implementation and recommending solutions;
- identifying new research areas or possible spinoff projects.

Ex post evaluation

Ex post evaluation is done upon completion of a project to determine achievements and estimate the potential impact of research. Researchers are required to submit terminal reports following a standard format, which facilitates analysis of research results and data banking. The validity and reliability of results are assessed in light of the methodology followed, level and type of analysis made, and status of the technology generated.

Specifically, the review of completed projects aims to identify several things: generated technologies requiring further field testing and verification; technologies ready for packaging, dissemination, and utilization; new researchable areas; and significant findings of interest in policy making and planning. The review also establishes the potential impact of the research, especially benefits to client groups.

Impact studies and technology assessment studies are used to assess the economic, social, technical, and environmental impact of technologies tested by farmer cooperators. Some indicators used in impact evaluation are:

- utilization/adoption rate;
- cost of adopting the technology;
- range of incremental output and income attained by farmer cooperators using the technology;
- input use and resource use efficiency;
- the state of the local environment under which the technology was tested;
- change in living standards and sociocultural characteristics of technology users.

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M&E case 3: Indonesia

Isbagio Paransih

Most agricultural research in Indonesia is conducted by the Agency for Agricultural Research and Development (AARD). Formed in 1974, AARD is one of six technical divisions of the Ministry of Agriculture. Its professional staff totals about 1100 scientists, of which about 14% have a PhD and 22% an MS. AARD receives 2 to 3% of the total public-sector budget, for a total annual budget of about US\$44 million.

Until the late 1960s, monitoring and evaluation of agricultural research in Indonesia was limited mainly to examinations of expenditures and training in relation to the targets of donor-funded projects. Evaluation in AARD really began with a USAID study of research needs in 1968. The most important experiences in M&E during the 1970s related to commodity programs: the annual evaluation of progress of the cooperative rice research program (supported by the U.S. Agency for International Development and the International Rice Research Institute), the in-depth evaluation of research on potatoes (International Potato Center and AARD), and the evaluation of animal production research (Australian Development Assistance Bureau and AARD).

The first initiative toward establishing a structured evaluation program in AARD took place in 1981. At the request of the director general of the agency, ISNAR conducted a broad review of the progress that AARD had made in its first five years of operation. One of the recommendations was that AARD should establish a formal system of M&E.

In 1983 AARD and ISNAR jointly developed a standardized methodology for M&E at the research program level. During the period 1984 to 1987, AARD reviewed 10 research programs with ISNAR assistance. The objective in each case was to assist managers in analyzing past, ongoing, and proposed future activities and in identifying ways to strengthen the research programs.

Types of monitoring and evaluation

Five types of M&E activities are currently carried out:

- *ex ante* evaluation covering individual research proposals and the research master plan;
- monitoring of on-going projects including field evaluation, financial and technical reports, and seminars on research results;

- *ex post* evaluation of programs and analysis of research results through a management information system;
- impact studies carried out jointly by AARD and ISNAR;
- monitoring and evaluation of donor projects, done nationally but relating mainly to physical use of funds and resources and to training.

Strengths of the M&E system

- M&E is mainly internal with heavy involvement of both directors and scientists in the review process.
- Evaluations are output-oriented and thereby introduce the concept of accountability through their examination of priorities, links with extension and farmers, and impact.
- The M&E process is open, with wide-ranging and frank dialogue with many managers and scientists. It can therefore be considered as a form of in-service training.
- Recommendations, rather than suggesting concrete solutions, identify options. This encourages managers to rationalize and make appropriate decisions.

Weakness of the M&E system

The low level at which the evaluation unit is positioned within the hierarchy makes it difficult to ensure that there are enough trained staff with sufficient seniority to influence the implementation of recommendations.

Isbagio Paransih is Secretary of the Indonesian Agency for Agricultural Research and Development (AARD).

M&E case 4: Morocco

Hussein Faraï

The Institut National de la Recherche Agronomique (INRA), established in 1981, is the main public agricultural research institution in Morocco. With an annual budget of US\$20 million, it employs 200 agricultural researchers of which 150 have an MS or PhD degree.

INRA has several major responsibilities:

- to conduct agricultural research, whether scientific, technical, or economic;
- to conduct studies concerning the natural environment and the improvement of plant and animal production;
- to monitor research or other work conducted on behalf of public agencies;
- to examine the procedures for the application of the research results.

INRA is organized into four divisions: Programming, Information and Training, Regional Centers, and Administration. Ten regional centers coordinate and manage a number of research stations. The Regional Centers Division is the coordinating arm of the centers.

Other important components of the national system are the Institut Agronomique et Vétérinaire Hassan II (IAV), the Ecole nationale d'agriculture de Méknès, and the universities. The major agricultural research institutions are under the aegis of the Ministry of Agriculture. Several donors support agricultural research.

The Programming Division is responsible for M&E of research; the Administration Division for M&E of management activities.

The only regular monitoring deals mainly with budget implementation and with the production and sale of improved seed. Each month, data are collected on expenditure, and twice a year progress reports are prepared for two projects financed by the World Bank and the Kreditanstalt für Wiederaufbau.

More comprehensive evaluation activities are conducted annually. They include:

- annual evaluation of research personnel on the basis of which incentives, salary increases, and new positions are determined;

- annual budgeting meeting which provides an opportunity to evaluate the efficiency of management procedures;
- annual foundation seeds meeting;
- annual regional meetings to review research results with extension agents and farmers;
- annual meeting of INRA with the Moroccan Parliament to promote the position of INRA among policymakers.

In addition to the regular monitoring and evaluation activities carried out by INRA, three main reviews have taken place since the creation of the institute. The first one, a general assessment, was carried out in 1979 and led to the creation of INRA as an autonomous institute. The second one was a diagnostic review conducted jointly with ISNAR as the basis of a master plan for agricultural research. Finally, in 1987 five programs supported by the World Bank were reviewed.

Evaluation of research on specific commodities (cotton, oil palm, and forage crops) has been done by INRA to convince donors to support research.

Problems encountered

The M&E system within INRA has a number of problems and weaknesses:

- use of informal M&E mechanisms;
- absence of a formal framework for M&E;
- lack of uniform indicators, criteria, and procedures for M&E;
- absence of M&E specialists;
- lack of time and motivation.

Hussein Faraj is Director General of the Institut National de la Recherche Agronomique (INRA), Morocco.

M&E case 5: Caribbean Agricultural Research and Development Institute (CARDI)

Callixte George

CARDI is the main agricultural research and development institute of the Caribbean Community (CARICOM). Founded in 1975, CARDI serves the member countries of CARICOM: Antigua, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts/Nevis, St. Lucia, St. Vincent, and Trinidad and Tobago.

Agricultural research in the region dates from the days of the Imperial College of Tropical Agriculture (ICTA) founded in 1921. The Regional Research Center was added to ICTA in 1955. It merged with the faculty of Agriculture of the University of the West Indies in 1966, and in 1975, became CARDI, an autonomous regional research and development institute. CARDI's mission is to contribute to agricultural development through the generation and dissemination of appropriate technology.

CARDI has its headquarters at the University of the West Indies in Trinidad and has units in Jamaica, Barbados, Belize, Guyana, St. Kitts/Nevis, and St. Lucia. CARDI employs 38 agricultural researchers and has an annual budget of about US\$1.7 million.

Planning and Evaluation Unit

CARDI's Planning and Evaluation Unit is responsible for developing medium- and long-term plans, coordinating external reviews, and annual planning and evaluation of programs and projects. Monitoring is the responsibility not of the Planning and Evaluation Unit, but of senior managers, particularly directors, program leaders, and representatives of regional stations.

The M&E system has two key elements: a strategic planning process and an annual review and planning process.

Strategic planning centers around an in-depth evaluation of the institute's programs every five years. This evaluation involves senior staff, Ministry of Agriculture personnel, farmers' representatives, and other knowledgeable people. Together, they analyze relevant political, economic, and social factors and develop policies and strategies for the institute.

Annual review and planning are the cornerstone of CARDI's management. They combine top-down policy guidance with bottom-up planning to establish each year's budget and work program.

Implementation, monitoring, and evaluation occur as part of the whole annual review cycle. During implementation, regional stations keep in touch with program leaders, who monitor progress, problems, and prospects. In addition, activities are evaluated and impact studies are conducted to determine how programs contribute to fulfilling the research needs of the Caribbean region.

The following M&E mechanisms are used by CARDI:

- project and program activity proposals;
- field evaluations;
- quarterly progress reports;
- quarterly project-management committee meetings;
- program leaders' review;
- annual review and planning meeting;
- publication of research highlights;
- annual reports;
- impact assessment of technology generated;
- project reviews and evaluations;
- program reviews and evaluations;
- institute reviews and evaluations;
- special thematic technical workshops and seminars;
- workshop organized by the Ministry of Agriculture and CARDI;
- technology transfer workshops and seminars.

Ex ante analysis of projects and programs is minimal. In contrast, several types of monitoring are conducted at various levels within CARDI. *Ex post* evaluations are done at varying intervals. Institute reviews are undertaken every five years, while program reviews are conducted every two years. Project reviews are usually done jointly by donors and CARDI; their timing depends on the duration of the specific project — usually two to five years.

Problems in the M&E system

- irregularity in the submission of progress reports to the project leader;
- inadequate linkage between work performance and budgetary allocations;
- inadequate computer training of researchers;
- little analysis of progress reports and of results obtained from evaluation exercises;
- difficulties in introducing M&E into the culture of the researchers;
- weak integration of planning with M&E activities;
- weak assessment of technologies developed;
- lack of a methodology for reviewing the quality of output of individual researchers;
- variations in formats for reporting progress of donor-funded projects;
- weak linkage of M&E to other parts of the agricultural system, such as technology transfer;
- informal M&E procedures that are not standardized and more qualitative than quantitative.

Calixte George is Executive Director of the Caribbean Agricultural Research and Development Institute (CARDI).

Postscript

In response to the conclusions of the consultation, ISNAR has stepped up its work in the area of M&E, emphasizing the identification of practical methods and approaches of direct use in NARS. The literature review has moved ahead, with an expected completion date of December 1991. At this time, a specialized bibliographic database covering more than 1500 M&E documents will be fully operational. ISNAR staff, NARS personnel, and others concerned with agricultural research management will be able to use the data base to locate key references on a broad range of substantive and methodological aspects of M&E.

In M&E, as in other aspects of agricultural research management, ISNAR's work is need- and demand-driven. In order to base our future work on the real needs and opportunities in NARS, a series of country case studies is being done. These will document the present state of M&E in selected NARS, including past successes and failures in this area. They will assess barriers and opportunities for improvement, register NARS managers' priorities, and identify key areas where ISNAR and other international agencies can contribute to the process. Financial support for case studies in Morocco and Tunisia has been provided by IDRC, and support for studies in Latin America is being sought from the Inter-American Development Bank (Banco Interamericano de Desarrollo).

At the consultation there was consensus on the importance of training in M&E for agricultural researchers and research managers. Currently, all of ISNAR's work on M&E is oriented toward providing information and modules that can be used in training events conducted by NARS, by ISNAR, and by other organizations providing management training for NARS.

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