

Report to the Director General of the
Burundi Institute of Agricultural Sciences
(ISABU)

PU-AB-14 (ISNAR R33e)

**ORIENTATION AND MANAGEMENT OF
RESEARCH IN THE BURUNDI INSTITUTE
OF AGRICULTURAL SCIENCES :
ANALYSIS AND RECOMMENDATIONS**

ISNAR

International Service for National Agricultural Research

The International Service for National Agricultural Research (ISNAR) began operating at its headquarters in The Hague, 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 non-profit autonomous agency, international in character, and non-political in management, staffing, and operations.

Of the thirteen 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.

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PN-ABC-141

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January 1989

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International Service for National Agricultural Research

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 * Each section of this chapter contains recommendations.

SUMMARY OF MAIN RECOMMENDATIONS

1. PLANNING AGRICULTURAL RESEARCH

ISABU's role is to provide production and resource conservation technology. But it should also create a capacity of its own to supply Government with technical and socioeconomic information for policymaking and planning purposes.

For its program planning, programming/budgeting, and evaluation, and also to inform its Board of Governors, ISABU needs annually updated, easy-to-analyze, summary information on its programs, sub-programs, themes and operations, in the form of program data sheets ("fiches-programme") and operation data sheets ("fiches-opération").

Any changes in donor support should be planned and scheduled jointly between ISABU and its donors in the context of an ISABU long-term plan with priorities. This should include the planning of a timely transfer of financial responsibilities, early training of national replacement staff, and a Government commitment to keep these nationals in place.

2. EXPERIMENTING WITH "RESEARCH WORKSHOPS" IN THE RURAL AREAS

The "research workshop" approach, which is an important conceptual breakthrough within ISABU, must be regarded as an experiment, and should be designed, conducted, and evaluated as such. Because of human and financial constraints, workshops can only be started in a few regions, initially. A workshop should be located within an SRD or project wherever possible.

Far-reaching decisions concerning team size, team composition, and linkage arrangements have to be made. Intensive dialogue with farmers implies the permanent local presence of an ISABU team, adequately provided with accommodation and operational support, and enjoying considerable financial autonomy. Given the scarcity of researchers with the exceptional qualities required, a small team of one or two generalist researchers plus a few technicians per workshop is to be preferred. They would be supported by ISABU's commodity and thematic researchers, and by the Small Farming Systems Research (SFSR) project for diagnostic-survey methodology. The host SRD or project and the farmers concerned should be involved in choosing the priority themes for workshop research.

3. STRUCTURE OF ISABU

It is recommended that there be only two scientific departments, one for research on commodities ("Département des Productions") and one for

research on environment factors and production systems ("Département Etudes du Milieu et des Systèmes de Production" -- EMSP). EMSP would include the research workshops, as well as the SFBR, which itself might be converted into a research workshop. Within each department there would be no subdivisions other than programs, so as to simplify lines of communication, and to facilitate monitoring, evaluation, planning, and programming. The Library/Documentation unit, "Biométrie/Informatique", and the Seed Control Service would remain support services.

The Board of Governors ("Conseil d'Administration"), the Committee of Directors ("Comité de Direction"), and the Scientific Commission ("Commission Scientifique") would receive additional tasks. Program committees ("comités par programme") and a Promotion Commission ("Commission d'Avancement") are recommended new creations; their attributions and proposed composition are specified in the report.

4. MANAGEMENT OF HUMAN RESOURCES

ISABU needs objective criteria for deciding on the necessary staffing of its stations and research workshops. Implementing a staff decentralization policy requires improved working and living conditions for researchers and technicians at the stations.

More attractive career opportunities for research technicians should be developed, including a long-term ISABU training plan, with training abroad as a reward in career development. More A2-level technicians are needed.

A system of scientific grades is recommended, to replace the present system of administrative grades linked to management functions. Accession to a grade would depend on academic qualifications plus an assessment of other criteria by the Promotion Commission. A one-year probation period would apply to all new recruits.

Recruitment for key positions should be based on a detailed statement of required qualifications and a job description.*

ISABU cannot function efficiently without really applying the sanctions for misdemeanor or incompetence specified in its regulations.

5. TRAINING

To strengthen the scientific potential of ISABU's future staff, the Faculty of Agriculture of the University of Burundi might mount a course in research methodology to be given by senior ISABU researchers. These researchers should also supervise more student theses ("mémoires"). ISABU, as well as technical cooperation agencies, needs to make a more systematic effort to support local short courses, seminars, and intensive

* These are provided in the report for the posts of director of the recommended scientific departments and that of head of a research workshop.

on-the-job guidance. ISABU's most experienced researchers (expatriates and nationals) should participate in training junior colleagues as part of their job descriptions, and they should be evaluated on it.

It is recommended that some 60% of the national researchers obtain a specialized M.Sc. degree or equivalent, by research plus coursework, and that the strongest 20% go on for a doctorate. The research work should be done in Burundi, through joint supervision arrangements involving staff of the overseas university, the University of Burundi and/or ISABU.

ISABU needs a medium-term plan and time schedule for advanced training prepared jointly with donors, to ensure that all interests in supporting training are coordinated and utilized to the country's best advantage. The Government should also create such conditions that staff members return and stay for a reasonable period, if necessary on contract.

6. INFORMATION MANAGEMENT

Donors and Government need to make financial provisions for meetings and missions on specific problems and themes, and for exchanging scientists between institutes within and outside the region. For the CEPGL region, IRAZ has a key role to play as a clearing house of scientific documentation between the three national institutes (INERA, ISABU, ISAR) and their stations.

The person in charge of the library needs to be trained as a librarian/documentalist. Meanwhile, an expert foreign mission might help reorganize the service. The access to documentation of staff in the outlying stations is a special problem that needs to be studied.

ISABU needs a consistent publications policy, as well as corresponding guidelines for editing, review, layout, and production of its various types of publications. A professional scientific journalist could make a strong contribution. He could also help enhance ISABU's efforts to inform donor representatives, politicians, ministries, and the public at large.

7. FINANCE AND PHYSICAL RESOURCES MANAGEMENT

It is strongly recommended that the Government subsidy to ISABU be doubled without delay, to 220 million FBu in 1987 terms. This would enable ISABU to pay for all national researchers and technicians, maintain its infrastructure, and make a small contribution to the operating expenses of some programs. It would greatly enhance ISABU's credibility in program negotiations with its partners.

A complete inventory and objective evaluation of all infrastructure at all stations is urgently required. The costs of repairs and modifications should be established, and the size of a minimum maintenance budget determined.

To improve station management, it is worth experimenting with cash advances for specified categories of items, to be administered by the station directors. This demands a combination of more flexible

accounting regulations, satisfactory instruction of directors in procedures and responsibilities, appropriate control mechanisms, and rigorously administered sanctions when the need arises.

ISABU might try to reduce delivery time of orders placed through the AGCD in Belgium by requiring all researchers to submit their purchase orders at the beginning of the fiscal year (September) for immediate compilation and despatch, so that processing in Brussels can take place as soon as the Belgian Council of Ministers has approved the Budget.

The planned computerization of the CTB accounting system in ISABU is an opportunity to provide the whole institute with a modern accounting system at little cost, by also computerizing the ISABU accounts and integrating the two. The result would be: harmonization of all expenditure records; instant availability of expenditure and balance statements, per program; economy in manpower use; fewer errors; and an opportunity for in-service training of ISABU personnel who have the basic qualifications.

8. OBSERVATIONS ON SOME PROGRAMS AND SERVICES

To integrate national concerns for high-quality seed and high-performance varieties, it is recommended that the Government create a high-level National Seed Council to (i) formally approve new varieties for release and multiplication, on the basis of technical advice from a Committee for the Acceptance of New Varieties, and (ii) oversee the work of two services:

- a National Seed Service (SNS) for the production of basic seed, and the organization and supervision of further seed multiplication and distribution;
- an entirely autonomous Seed Certification Service under the administrative supervision of the Minister of Agriculture and Livestock.

The Pre-extension Service of ISABU should have a larger and more highly qualified staff, including a professional film-maker. They need intensive communication with the extension services of MINAGRI, SRDs and projects. MINAGRI might promote these linkages by posting to this Service a senior extension officer as a research-extension liaison agent.

The SFSR will have a specific role to play in proposing methods for, and taking part in, the diagnostic surveys for the research workshops. For the remainder, it is recommended that the project be regarded as a research workshop in its own right, with its own geographic area of operation and its own priorities based on local needs, as already identified.

1. INTRODUCTION

1.1 Origin of Mission

On March 1, 1988, the Director General of the Burundi Institute of Agricultural Sciences (ISABU) requested ISNAR to assist ISABU in improving its effectiveness. In its initial response, ISNAR expressed its inability to accede to this request due to a very full agenda, but following some further communication a short review mission with limited objectives, to be undertaken in August-September 1988, was agreed upon. USAID-Burundi has financed this mission.

1.2 Terms of Reference

The objective of the mission was to make recommendations to the Director General of ISABU for feasible improvements in structure, organization, and management of his institute in the light of its mandate and statute.

Specifically, the expected outcomes were:

- Observations on alternative internal structures that would better enable ISABU to meet its research goals and satisfy the needs of its clients.
- Recommendations for improving linkages between ISABU and other organizations, both within and outside Burundi, engaged in the generation and diffusion of technology, especially the adaptive research components of development projects.
- Suggestions for the organization and management of research in ISABU, taking into account the political and technological environment.
- Recommendations concerning the management of human resources, notably those arising from the adoption of the above recommendations.

1.3 Methodology

An ISNAR team composed of two staff members Dr. R.B. Contant (mission leader) and Dr. R.H. Bourgeois, has been involved for a total of eight weeks, of which three were devoted to the preparation of the mission and the visit to ISABU (August 24 to September 9, 1988), and five to the writing of a draft report and this final report.

The team was provided with an initial set of documents in August 1988, and further documents were obtained or consulted in Burundi. The ISABU Director General's visit to ISNAR in The Hague, on August 16 and 17,

enabled him to specify in more detail the issues for which he most desired ISNAR's intervention.

During its stay in Burundi, the team visited ISABU headquarters in Bujumbura, as well as 10 of its 16 experiment stations and "centres".*

In all, over fifty persons were met, mostly researchers -- both national and expatriate -- and technical personnel, but also administrative staff.

The team also held discussions with the Dean of the Faculty of Agriculture (FACAGRO) and the Dean of the Faculty of Economic and Administrative Sciences of the University of Burundi. Representatives of several external organizations were met, notably of USAID, the World Bank, and FAO, as well as of the Belgian Embassy in Bujumbura. During its five-day journey to different parts of the country, the team held discussions with directors of two integrated rural development projects (SRD-Kirimiro and SRD-Buyenzi) and with directors and researchers of the Agricultural and Livestock Research Institute (IRAZ) of the Economic Community of the Countries of the Great Lakes (CEPGL) in Gitega.

Meetings were also held with the Directors General of Agriculture, Livestock, and Agricultural Planning of the Ministry of Agriculture and Livestock (MINAGRI). The last days of the mission to Burundi were devoted to intensive discussions with the Director General of ISABU as well as two special meetings, one with the Minister of Agriculture and Livestock, the other with the above three Directors General of MINAGRI and the Director General of ISABU. The Coordinator of the Belgian technical cooperation program in ISABU met with the team at ISNAR headquarters shortly after its return from Burundi.

The team prepared a draft report in French and English, which it sent to the Director General of ISABU in October 1988 in sufficient copies for wide distribution, in order to obtain ample feedback from the persons met during the mission. Lastly, the Director General of ISABU visited ISNAR in January 1989 for discussions on the final version of the report.

This report, published in French and English, is primarily intended for the Director General of ISABU, to assist him in his efforts to improve the functioning of his institute. It is also intended for the authorities of MINAGRI and of all institutions and organizations that maintain relations with ISABU. As all these readers of this document are familiar with Burundi and its institutions, little general information is presented in this report, which concentrates on action proposals in line with the terms of reference.

* Stations: Gisozi, Imbo-Centre, Mahwa, Moso, and Rukoko.
Centres: Kayanza, Munanira, Murongwe, Mwokora, and Ndebe.

2. PLANNING AGRICULTURAL RESEARCH

2.1 National Agricultural Development Objectives

The development of Burundi's agricultural resources is a long-standing national priority. The overall objectives for the agricultural sector, as stated in MINAGRI's document "Politique Sectorielle de l'Agriculture et de l'Elevage" of May 1988, are the following:

- cover the food needs of a rapidly growing population;
- produce exportable commodities so as to procure the foreign currency needed to finance the country's infrastructure;
- increase the farmers' income so that the rural areas can modernize themselves and become a market for the industrial sector.

2.2 The Place of Agricultural Research, and of ISABU

The place of agricultural research in the realization of these objectives is not sharply defined. The agricultural authorities generally consider that this research must permit the introduction and generation of new technologies to intensify small-holder agricultural production, and to bring the still available land into production.

ISNAR is convinced that agricultural research must also play another important role, that of providing the Government with information for policy-making and planning. This role is not generally recognized and not systematically developed, although ISABU has, within its limited means, produced some important and much-cited studies.

To play this additional role, ISABU must have at its disposal more funds and people than it has today. However, building a capacity for reflection that enables ISABU to fulfill this advisory function with decision-makers is a long-term process which may be developed progressively. The recommendations in this report are meant to respond not only to specific problems, but also to the wish of the ISABU leadership to prepare the institute for this function.

In recent years, the national development authorities have addressed some criticisms at ISABU concerning the efficacy of agricultural research: limited impact of technological innovations in the rural areas, dispersion of programs over many research themes with little coherence, insufficient knowledge of rural conditions, lack of resources. These opinions have certainly contributed to the tendency of SRDs and projects to undertake their own research, a situation which has sometimes led to duplication in the utilization of already scarce human and financial resources. However, such duplication of efforts has not markedly improved the efficiency of technology transfer.

While these criticisms have exposed certain weaknesses in ISABU, they have not taken into account their origin, which cannot be dissociated from the general context of development in Burundi. Be that as it may,

ISABU is the only national agricultural research institute in Burundi and therefore needs to be developed. It is in this perspective that the next sections will deal with each of the different priority areas for action in ISABU in the context of agricultural development in Burundi.

2.3 Need for Concerted Planning of National Agricultural Research

Except for some very broad general orientations, Burundi today does not engage in any real planning of its agricultural research. In the absence of well-documented directives from MINAGRI or the Ministry of Planning, it is impossible to put into place a research policy which is relevant to the country's needs. The linkages between ISABU and MINAGRI are weak, and ISABU cannot at present provide the basic information required for proper planning of agricultural development.

The case of livestock production is a particularly good illustration of the need for such linkages. Both within MINAGRI and within ISABU there is a diversity of views as to what livestock policy should look like. In the absence of a consensus among the different actors, each defends his personal view, and with justifiable arguments.

For example, one of the programs contested so far -- that of developing the capacity for dairy production through Ankole x Sahiwal hybrids -- has proven its potentials thanks to an original experiment conducted in a real on-farm situation. The question now is whether one must develop new crossbreeds (with Montbéliard, Ayrshire, Jersey, Friesian) or improve the management of a Sahiwal herd. The decision, which has important economic consequences, lies in the realm of policy, but ISABU must contribute by providing as many basic elements as possible to the debate.

The country's economic conditions also have a bearing on research planning. The availability or non-availability of inputs (imported or produced locally), the problem of credit in the rural areas, and the condition of the infrastructure, are all constraints which planners must take into account in defining the orientations of agricultural research. Lack of marketing opportunities limits the impact one may reasonably expect from research. This is especially the case if the aim of this research is to increase production beyond self-sufficiency in order to cover national food needs, which presupposes the development of markets for both inputs and consumption goods.

ISABU's five-year plan for the period 1988-93 is an attempt to overcome the lack of precise and well-documented directives from national planning authorities. It is a commendable document, although it must be noted that there has only been weak consultation and dialogue, in the course of its realization, among researchers, between programs, and between departments. Absent also is a long-term vision as to what agricultural development should look like in Burundi, due to the fact that such a vision is also missing from national planning documents.

Lack of national directives and absence of a coherent vision of national agricultural development are among the causes of ISABU's inability to concentrate its activities on well-defined needs.

It appears, for instance, that most commodity programs have been concentrating heavily on selection and genetic improvement, but nothing indicates that these research lines are the most appropriate to meet the country's most urgent requirements.

Program planning must take into consideration the limits on funds and manpower, not only in ISABU, but in Burundi as a whole. In fact, some coordinated action is being taken with this in mind. For instance, ISABU and FACAGRO have formally decided to divide and share animal production research, with FACAGRO taking on the small ruminants. Furthermore, several SRDs and projects include a component of adaptive research which, thanks to the resources of which they dispose, should be a valuable complement to the efforts of ISABU. To date, these activities have been perceived as a manifestation of lack of efficacy of ISABU's research work (cf. 2.2). Better consultation between the different actors would enable them to jointly define their respective roles, which must be closely linked. ISABU could take the initiative for the creation of an inter-institutional coordinating body at the appropriate level.

Moreover, is research working for today's farmers or for those of tomorrow? When determining research priorities and orientations, it is the task of national planners and research leaders, reflecting together, to specifically take into account the ecological as well as the demographic and socioeconomic evolution of the rural areas, so as to avoid research results being obsolete even before their diffusion has begun. Ecological conditions are taken into account. Today's priorities of the national planning authorities and ISABU in this regard are erosion control and management of the environment, as well as crop protection. But if attention is not also paid to demographic and economic trends, research runs the risk of proposing technological solutions which are ill-adapted to the farms of tomorrow. One cannot ignore that population increase, inheritance practices, and increasing cash needs, all lead to a splitting up of farms and a deterioration of the land, on which -- even so -- more will have to be produced. Research on new technologies must be conducted from now on for those categories of farms which will be the most numerous tomorrow, so that the technologies generated will respond to the needs of what will be the majority of the population.

2.4 Influence of Linkages with External Assistance Agencies

The international and bilateral cooperation organizations have also played, and continue to play, an important role in program definition.

Belgian influence on the research program is the strongest. This is logical, as Belgian technical cooperation is still the most important source of external support to ISABU, financing a large proportion of its operating budget and the salaries of quite a few nationals. Consequently, dominant scientific influence from abroad has been present for a long time, and has created, among both nationals and expatriates in ISABU, a strong reticence to the principle of scientific sponsorship ("parrainage scientifique"). Nevertheless, some better-adapted types of collaboration, notably various twinning arrangements ("jumelage"), if properly planned, supported, and monitored, can be among the most attractive forms of scientific cooperation.

It seems that a much-improved, decentralized formula for scientific support on the part of the Belgian technical cooperation project in ISABU is in the offing.

Other criticisms concerning the Belgian-supported research programs stress their dispersal, and insufficient relevance to the country's needs. Though broadly acceptable, these criticisms should be qualified by a careful analysis of the quality and relevance of each program. The current recognition by ISABU's leadership of the need for new formulas to directly link researchers to the realities of the situation in the rural areas is strongly supported by Belgian Technical Cooperation, as well as by USAID and other agencies. This could lead to a more focused and coherent definition of research programs, including those in which external agencies cooperate, especially if appropriate joint monitoring and evaluation procedures are put into place.

Criticisms should not lead anyone to underrate the tremendous benefits which Burundi has derived ever since independence from massive and stable Belgian research cooperation. Even in 1987/88, Belgium financed as many as fifteen of ISABU's programs. For 1988/89, support for two programs will be discontinued, but new activities will start, so that the total investment will increase.

The USAID-funded Small Farming Systems Research Project (SFSR), in terms of external resources, is the second-largest external cooperation project in ISABU. It is valuable especially for having sensitized ISABU to the need for a systems perspective in research, and for having offered a multidisciplinary diagnostic methodology in which many ISABU researchers have participated. A difficulty with this project has been its weak connection with other ISABU activities. This has been aggravated by its location at Karuzi which, although strategically well chosen, has been somewhat isolated. ISABU may not have been determined enough to integrate this site into the mainstream of its activities. It also needs to develop a more articulated and critical interest in the SFSR approach, so that it can provide the required leadership in reorienting this project for its second phase.

The USAID/CIP-supported potato program, the CIAT-supported regional bean program, IDRC assistance in the maize and pea programs and the Gisozi "fermettes", French support for research in forestry, soil conservation and agroforestry (CRAF), EEC/Catholic University of Louvain support for cassava technology, and IITA assistance with the biological control of cassava pests, are all very effective and appreciated forms of assistance to agricultural research in Burundi. All of these projects are in line with national priorities. At least one of them (CRAF), incidentally, does not seem to receive a level of national support commensurate with its importance.

2.5 Relations with the SRDs and Projects

Discussions with ISABU researchers on the one hand and SRD and project officers on the other show that contacts between research and extension are weak.

Transfer of technology, irrespective of its nature, demands communication, and this has been minimal. The SRDs state that they have obtained only a few transferable technologies from ISABU. In reverse, the researchers remark on the lack of feedback from the SRDs and projects to which they have been providing innovations. Moreover, these new technologies are seldom accompanied by appropriate transfer processes.

The disproportion in budgets and manpower between ISABU on the one hand and the projects and SRDs on the other has made it impossible for ISABU to respond to all the requests from the latter. This state of affairs cannot be blamed exclusively on one or the other of these two parties, but primarily on insufficiently integrated planning at a higher national level, and a narrow project interest of donors. Other explicatory factors are the lack of means of communication, distances, and the absence of mechanisms for consultation. But, underlying all this, there has been no real desire for collaboration in order to overcome these difficulties.

To help close the gap between research and extension is what ISABU's Pre-extension Service, about which more later, has been trying to do during the last few years, with too limited means. Structurally, the gap still persists, as the pre-extension effort should be conceived jointly by the research and extension services.

2.6 Planning in a Regional Context

Planning of agricultural research in Burundi must take place in larger context, namely that of the Central African Highlands made up of Burundi, Rwanda and Eastern Kivu, where ecological conditions are closely similar. In particular, given their small size, and assuming that they have the means to efficiently carry out their respective programs, the national agricultural research institutes of Rwanda (ISAR) and Burundi (ISABU) should avoid conducting quasi-identical activities. A real dialogue between these institutes, also at the level of their parent Ministries, appears indispensable to coordinating their efforts. It is squarely within the mandate of IRAZ of the CFPGL to play an important role in this regard. International research institutes can also play, and do already play, an important part in harmonizing research activities in the region: CIAT for bean research, CIP for potato research, ICRAF in the context of the AFRENA network.

2.7 Recommendations

i AN ENLARGED ROLE FOR AGRICULTURAL RESEARCH

In addition to producing technologies for increased productivity and conservation of natural resources, ISABU should progressively reinforce its role of providing Government with technical and socioeconomic information for policy-making and planning purposes.

This includes information on new agricultural production opportunities for different agro-ecological zones, and assessments of technical, economic, and social constraints; technical information on ways and means to minimize post-harvest losses on-farm and during processing and transport; estimates of agronomic inputs, capital, labor, and managerial skills needed to meet national agricultural sector plan targets; and information on the management of natural resources including renewable energy (wood for fuel). ISABU's Socioeconomic research program needs to be strengthened for this purpose, but there is also a need to orient some of the work of other programs in these directions.

ii. RESEARCH PROGRAM DATA SHEETS

It is recommended that research program data sheets ("fiches-programme") be utilized. Their primary purpose is to provide a concise common tool for planning and evaluation within ISABU, and to inform the Board of Governors. But they also serve as a basis for preparing succinct notes to explain and justify a program's broad orientations to Government decision makers and politicians. This requires, in particular, that specific program objectives, as well as the features of sub-programs and themes, be clearly spelled out.

What is lacking at the moment, due to the absence of a formal and consistent division of each program into sub-programs, themes, and operations, is an organized procedure for describing and justifying the sub-programs and themes. This has its repercussions on program orientation and balance. It is precisely at the intermediate level, i.e., of sub-programs and themes, that the broad thrusts of a program must be rendered the most explicit and be made to reflect its principal objectives. It is with reference to these specific objectives -- the continuing validity of which must be reexamined each year -- that the choice of operations must be made. It is the business of the institute directors and program chiefs to take the necessary steps to remedy the existing shortcomings.

The sub-programs correspond with the most important problem areas identified within a particular program. Within a given sub-program, themes must be identified which are the most promising research lines for tackling these major problems. If consistently followed, such a systematic and coherent problem-oriented construction of a program, based on precise goals, avoids dispersal of disjointed activities and gaps in research coverage. One will then find that many themes require the cooperation of researchers from different programs. For these themes, it will be necessary to jointly define the research content, then the resources and the time frame.

The program data sheets should include:

1. Title of program
2. Name and location of program chief
3. The national development objectives and major development themes that are served by the program in question
4. Descriptive titles and justification of the sub-programs and their themes

5. Potential application of results, with reference to:
 - geographic regions
 - potential users of results that are already available
 - potential users of expected results
6. State of progress and summary of results, and their utilization/ adoption, in relation to objectives and targets
7. Citations of reports and publications produced in the context of this program
8. Linkages with other institutions, projects and/or programs (actual and planned)
9. Names of researchers contributing full-time
10. Names of researchers contributing part-time (with number of person-months)
11. Names of technicians (with number of person-months)
12. Quantity of labor (permanent personnel only)
13. Additional personnel needed (researchers, technicians, labor)
14. Funding:
 - needs expressed
 - approved budget
 - amounts received
15. Additional equipment needed
16. Additional infrastructure needed.

Annual updating of this information is essential (while keeping past years' records). The best time to do this is when preparing the program and budget for the following year.

The question of substituting the current system of preparing annual program proposals ("propositions de programme annuel") by these program data sheets should be discussed and resolved within ISABU. The proposed content of the program data sheets is clearly open to modification, so as to make their utilization by the researchers as easy as possible. Moreover, the information needed to complete the forms, especially questions 9 through 16, would be perfected over time, partly on the basis of more detailed records taken from the operation data sheets proposed under (iii) below.

The program data sheets would be studied annually by a committee combining senior ISABU scientists and representatives of all donors, in order to obtain a consensus regarding future activities and their funding (cf. 4.3(iii)).

iii. RESEARCH OPERATION DATA SHEETS

The preparation and utilization of program data sheets finds its logical complement in preparation of operation data sheets ("fiches-opération") on the same principle. An operation consists of a coherent set of experiments carried out within a particular theme. A simple example of an operation is the testing of a particular type of live mulch, under the theme of mulching, within the soil protection sub-program of the coffee program.

An operation data sheet should be completed by the researcher responsible for each particular operation. But its adequacy in the context of the

program as a whole must be verified by the program chief. The data sheet should include:

1. Title of the operation
2. Name of researcher responsible, and his location
3. Starting date of operation, and anticipated completion date
4. Problem statement with reference to the theme to which the operation belongs, specification of evaluation criteria, and justification of the chosen methodology
5. State of progress and summary of results, and their utilization/ adoption, in relation to objectives and targets of the theme
6. Citations of reports and publications produced in the context of the operation
7. Linkages with the other operations under this theme
8. Linkages with operations in other programs
9. Personnel involved (with number of person-months where applicable)
 - names of researchers involved full-time and part-time
 - names of technicians involved full-time and part-time
 - quantity of permanent labor
10. Additional personnel needed (researchers, technicians, labor)
11. Funding:
 - needs expressed
 - funds approved
 - amounts received
12. Additional equipment and infrastructure needed

It may seem at first that filling such forms, notably points 9 through 12, is a time-consuming chore with limited value, especially for small operations. However, it seems difficult to obtain approval from those who allocate resources, of any research activity for which the needed people, equipment and funds are not specified. Furthermore, unless all research operations are covered, the resource information will be incomplete and cannot be used for any analysis, monitoring and planning.

iv. MONITORING AND EVALUATION OF PROGRAMS

Program monitoring and evaluation is an area of weakness of ISABU. The only evaluation system in place is the annual assessment of the researchers and other personnel. The implicit confounding of researcher assessment and evaluation of research activities is very detrimental to research quality, because the criteria for evaluating researchers and programs differ fundamentally.

Program evaluation mechanisms are lacking at all levels: ex ante (i.e., at the planning stage), in the course of program execution, and ex post (i.e., at the end of the operation). Nor is there any systematic evaluation of impact following the release of research results. In a situation where external criticisms of the relevance, coherence, and efficiency of its work abound, ISABU cannot postpone the introduction of a system of monitoring and evaluation of its research programs.

Scientific and relevance criteria (methodological rigor, logical sequencing --

starting with assimilation of current world knowledge, evaluation of results against set objectives) as well as efficiency criteria (resource utilization, adherence to time schedules) are needed, and should be discussed and adopted by all researchers.

Program data sheets and operation data sheets as recommended above, if properly updated and exploited, constitute a monitoring tool and facilitate evaluation. Annual meetings, program by program, should be held with all concerned researchers present, including those studying the transfer of results to users. These meetings would have the triple purpose of evaluating the past year's results and possible changes in circumstances (and adding to the data sheets accordingly), adjusting the programs, sub-programs, themes and operations as needed, and programming the following year's activities.

Thus, a formal evaluation process will play an important role in making research more dynamic and more responsive to changing needs. ISABU must develop its own system of monitoring and evaluation, including the definition of evaluation criteria and mechanisms. (Documents summarizing ISNAR's experience to date in this area have been given to the Director General of ISABU.)

v. TWINNING

Scientific twinning of researchers to respected senior colleagues in other institutions, in Burundi, other African countries, or elsewhere, would be a valuable instrument for improving research quality. Such senior scientists could be invited to participate in the evaluation and programming process in their areas of competence. A funding problem would be likely to arise in the case of proposals for South-South twinning. It is recommended that North-South twinning be promoted initially, and that the funding facilities this entails would be used to also include support for South-South linkages.

vi. PLANNING OF CHANGES IN DONOR SUPPORT

Changes in donor support should be gradual, and they should be programmed jointly by both parties. A critical aspect is timely planning of a financial and staffing takeover by ISABU and the Government of Burundi, in respect of any program which a donor wishes to vacate. Thus, a time schedule for the transfer of activities could be established to permit a progressive and non-disruptive shift of responsibilities in the direction of greater autonomy of ISABU, at a rate to be agreed between the different parties. This includes intensive collaboration between Burundi and donors for the timely training of replacement staff. It also calls for a Burundi commitment to keep such people in place, and to support them adequately. It is also necessary that a concerted, ISABU-led effort be undertaken to better define the institute's priorities, and perhaps reduce the number of programs, so that there will be a realistic framework within which future shifts in donor program participation can be planned.

3. EXPERIMENTING WITH "RESEARCH WORKSHOPS" IN THE RURAL AREAS

3.1 Opening onto the Real Farm Situation

The wish of ISABU's Director General to focus research more systematically on the needs of the rural areas throws into question the approach to and methods of agricultural research in general and ISABU in particular.

In-depth knowledge of most aspects of the farmer's reality is quite insufficient. On-station research is necessary but cannot test the economic and social parameters governing adoption. As a result, the technologies developed on-station and tested in multi-locational trials are not necessarily the most adapted to the social and economic conditions of rural people as they themselves perceive them. Thus, opening onto the real constraints of the rural areas is both the goal and a tool of the reorientation of research at ISABU.

To develop this tool, one must start from the basic assumption that deficiencies in program conception can be surmounted by a better exchange of information between researchers and farmers via extension, and through more direct work of researchers in a real farm situation.

As has been underlined by the ISABU Director General in his note "Quelques éléments sur la politique de la recherche à l'ISABU" of July 1988, a commodity research program must concern itself with the entire pathway ("filière") of the research, down to the study of farmer adoption, and must involve all the disciplines that are relevant to obtaining an adoptable result. This has rarely been the case at ISABU, except in one or two programs.

Any commodity research pathway should take into account the reality of today's farming practices, which are based on a high degree of integration of different production activities. It therefore involves interaction with other pathways. For instance, improvement of certain crop association practices (e.g. maize/beans) requires an integrated approach because of complex physiological, morphological, micro-climatological, epidemiological and other interactions arising from the crop association.

Opening up research to real-life constraints also implies taking into consideration certain regional specificities. Few technologies are suitable for diffusion throughout the country, especially in Burundi, which has such an enormous diversity in soils, climates, and topography. In several of its eleven natural regions, certain commodities show a comparative advantage. To concentrate research on these specificities is a logical and necessary step for ISABU, to make best use of its scarce resources, notably researchers and technicians. In fact, some ISABU research is already focused on agro-ecologically determined specificities (e.g., dairy in the Bututsi, rice in Imbo-Nord). However, this principle should not be followed to the detriment of the most disadvantaged regions or those which have been the least studied (Northern Moso, Bweru, Bugesera, Buyogoma), and for which new land-use patterns need to be developed.

At the national seminar on perspectives for agricultural regionalization as a development strategy, there was a clear call for prudence and realism in any government planning for regionalization of production. This is because of its enormous complexity, due to, among other things, the problems of cash availability, storage reliability, markets, road networks, and efficient and equitable distribution mechanisms.

Besides, regionalization of production is not synonymous with regionalization of research. Before starting research aimed at an intensive exploitation of regional potentialities, ISABU must assure itself that all conditions are met for producers to turn this regionalization to advantage. If a product rots in the field due to lack of marketing opportunities, or is sold at non-remunerative prices, much research time and money are irrevocably wasted.

Certain research experiences (e.g., "fermettes Bututsi") are testimony to the practical feasibility of a direct approach to the farming world in order to test and amend proposed technologies. Their success also shows, in the face of numerous criticisms, that research can indeed develop production techniques well adapted to local conditions and readily acceptable by farmers. For the researcher to gain, merit, and retain the confidence of the farmers is an essential condition in any such undertaking. A special lesson from this case is that the motivation of researchers and technicians has played a big part in the success of the operation. Indeed, it seems that the disappointing lack of transfer so far outside the limited number of farms with which ISABU works can partly be explained by the absence of such dynamism among those who, outside ISABU, are responsible for wider extension of the same technologies.

The joint organization by MINAGRI and ISABU of pre-extension activities involving researchers and extension agents together could bring about such dynamism, by putting the men of the field in direct contact with successful research approaches whose logic they would come to understand and which they would learn to reproduce.

3.2 Basis and Justification of Research Workshops

Whereas most criteria for ecological and agronomic suitability of a technology can be verified on-station, or on other controlled sites, this is not so with economic and social criteria, which require verification in the real-life environment.

If one wishes to improve, as in Burundi, the effectiveness of research as measured by the degree to which technologies are assimilated by the rural people, three approaches must be combined: (i) acquiring a better knowledge of the needs and characteristics of the farming people and their environment, (ii) determination of the technological priorities as a function of their urgency, feasibility, and cost, in relation to national directives concerning agricultural development, and (iii) the conduct of research activities proper (always starting with verification of whether the needed technologies are available locally or abroad).

From this logical sequence of steps has ISABU derived the idea of organizing research in the real-life environment through what are called

research workshops ("ateliers de recherche"), the objective of which is to make it possible to simultaneously tackle the above three processes.

Several factors have contributed to the growth of this idea:

- political factors, notably the criticisms voiced by Government regarding the effectiveness of ISABU;
- scientific factors such as the development of the "farming systems" paradigm in Africa;
- practical factors, such as the successful experience of the "fermettes Bututsi";
- ISABU's desire to bring research closer to the farmer, and to development in general;
- the support given and promised by the technical cooperation agencies.

3.3 Conceptual and Methodological Aspects

Although, for the parties involved (the technical assistance agencies, the ISABU Director General, researchers, SRDs and projects), the project of research workshops constitutes a stake for which each has its own strategy, there is a minimum consensus between them as to:

- the need for such workshops in order to improve the transferability of technical know-how to the farmer's environment;
- the necessity to work in pluridisciplinary teams;
- the necessity to do preliminary diagnostic surveys in order to understand the rural environment;
- the requirement for a local base, consisting of a representative sample of farms (or other units) to identify farmers' needs.

Differences of view concern the size and composition of teams, the size of the area a workshop would effectively cover, the precise form and mechanisms of interinstitutional collaboration, the division of responsibilities, etc.

In terms of methodology, the research workshop approach is based on the execution of a quick diagnostic survey intended to bring out the farmer's needs and constraints, and a more in-depth study to identify the participating farmers. Ideally, the themes of the workshop activities should be determined on the basis of these surveys and farmers' wishes. In reality it seems that choices have already been made on the basis of what ISABU and its partners perceive to be the intervention areas farmers need most ("spéculations motrices").

These choices may be quite appropriate, especially since in each case one or several cash-earning commodities are included. It is of fundamental importance, however, to keep an open mind for necessary changes in the light of survey findings. Once the "spéculations motrices" have been fixed, the cooperating farmers identified, and contracts drawn up, a selection of the most appropriate technologies is proposed to the farmer and tested with his or her approval.

Conceptually, the research workshop is a new approach to research at two levels: (a) a new method of doing agricultural research in general, (b) a new way of doing research in the real environment.

- (a) The wish in ISABU to create "research workshops" has as its basis a number of presuppositions, many of which are not clearly defined. Among these, there seem to be at least one basic postulate and one fundamental hypothesis. The postulate is that some technical and most socioeconomic constraints cannot be revealed during on-station research. The hypothesis is that the workshop is a means to acquire the knowledge and understanding necessary to overcome the principal constraints to technology transfer. Thus, the workshop as a research approach must itself be tested for its ability to confirm this hypothesis. This means that neither the form nor the work methods within the workshop can be regarded as definite. The absence of convincing experience in this area, in Burundi or elsewhere, makes any generalization of this approach premature. A continuing evaluation of the workshop activities is necessary to adjust the process in the light of obstacles encountered and the quality of results obtained.
- (b) The workshop is a new approach to research under real-life conditions in that it expects to provide a real in-depth understanding of these conditions, socioeconomic as well as technical, without wishing to control them, and with the immediate purpose of developing techniques which have the best chance of being adopted by farmers. The overriding importance of the human factor makes it rather inappropriate to employ at this level the methods of the natural sciences. The resulting uncertainty must be accepted as a feature of the environment, even if it can be reduced by a representative choice of the diversity found in the farming areas. This approach, sharply focused on mastering the constraints to technology transfer, complements that of other research which takes place in a more or less controlled environment (including certain kinds of on-farm research). One of the advantages of adding this activity to the classical research approach is that it can contribute to revealing and overcoming imperfections in the proposed technology before calling into action the entire extension service.

In contrast to other research approaches within a rural setting, the workshop approach leaves open the possibility to consider other basic units than individual farms as its research objects, and other targets than the individual farmer-producer, for instance, whole "collines", water catchments, groups of farmers on communal pastures, etc.

3.4 Organizational and Practical Aspects

The importance attached to dialogue with farmers, and communication in general, requires the permanent local presence of a team of researchers.

This implies:

- housing and office accommodation;
- means of transport;
- operational support: administrative and typing services, assistants, stationery, farm inputs, etc.;
- funds, which moreover can be used with sufficient flexibility to meet contingencies.

Definite choices must be made regarding the modalities for putting the workshop into place:

- regional bases, either throughout the country or limited initially to certain ecological zones;
- team size: 1 or 2, 3, or 4 researchers or more;
- team composition: specialists or generalists, or a mixture;
- creation of a more or less new infrastructure, or utilization of an already existing one in an SRD or project;
- immediate generalization of the approach in ISABU, as a complement to existing research approaches, or regarding it as an experiment in research methodology, as advocated above.

Thus, two organizational possibilities have been suggested to the mission:

- i. Bring together in each workshop an ISABU team composed of four or five researchers, for example:
 - 1 "ingénieur agronome" for food crops and/or industrial crops;
 - 1 person specialized in soil fertility/fertilization;
 - 1 "ingénieur agronome" for animal production;
 - 1 socioeconomist.

These researchers would be based either in an SRD or a project, or at an ISABU station, or at another location in a region where special relationships can be developed with the Department of Agronomy of MINAGRI.

- ii. Form a much smaller team, of one or two very able researchers (who should rather be generalists), assisted by a few agricultural technicians. The scientific composition of this team would depend essentially on the priority themes chosen. These would in any case be addressed in close liaison with the relevant scientists of ISABU and other institutions in Burundi.

The mission recommends (cf. 3.6.iii) that this second possibility be selected, because it takes into account the likely difficulties of finding a sizeable number of researchers with the required qualities. It also gives more explicit weight to the intended support from other researchers, and thereby reduces the risk of seeing the emergence of a series of new "research stations", which ISABU cannot afford.

3.5 Difficulties with the Workshop Approach

Some preconditions must be met when creating research workshops, in the absence of which no success can logically be anticipated.

The first condition is the availability of a local infrastructure to accommodate 4 to 8 additional persons (researchers and technicians) and support their work. Where such a structure does not yet exist, one risks creating what would resemble a totally new research unit, in a situation where ISABU does not even have sufficient means to maintain its existing stations.

Another critical condition is the possibility to attract very competent researchers. This competence should exist at several levels, notably in respect of:

- knowledge of the rural environment;
- aptitude for pluridisciplinary teamwork, which requires that the researchers no longer consider their own field of activity as the most important;
- aptitude for participative, as distinct from directive, communication with farmers and extension agents.

This competence must be accompanied by a high degree of motivation and a personal engagement of the researcher. It also demands considerable maturity and modesty for a researcher to confess ignorance in front of farmers when certain problems expressed by them are beyond his knowledge, and to seek the required scientific or technical support from colleagues in ISABU or elsewhere.

It seems that the present research and education system has not been in a position to prepare an adequate number of researchers for these tasks. The greatest possible care is needed, therefore, in the choice of personnel to be assigned to the research workshops.

3.6 Recommendations

i. PRECAUTIONS IN STARTING RESEARCH WORKSHOPS

The limited capabilities of ISABU, in terms of both human and financial resources, restrict its possibilities to create research workshops. It would be desirable that the functioning of these workshops be financed as soon as possible and as completely as possible from the national budget allocated to ISABU (provided this budget is substantially increased, cf. 8.1). This would enhance the credibility of this project, and would not represent too heavy a financial burden if the mission's recommendations are followed.

However, if the required discipline, motivation, and "workshop spirit" are lacking, and if there is no strong will to provide the essential financial and operational means -- including flexibility in their management -- this concept will remain inoperative. There is no single organizational mode able by itself to radically transform the functioning of a research institution.

The creation within ISABU of a system for research in the rural areas must be viewed in the overall context of a reorientation of research. If this is not done, there will be points of conflict, unjustified duplications of effort, and new communication problems. However, the dynamism needed for the system's success does not come only from structural reorganization but more essentially from the will of the persons involved.

As long as the research workshops have not demonstrated their real effectiveness in the rural areas, it would be risky to launch such an operation on a large scale. For the moment, the process itself is an experiment, and it must above all else be conducted and evaluated as such.

Thus, two risks must be avoided:

- institutionalization of the "research workshop" as the dominant approach within ISABU;
- premature generalization of this approach for all real-life research activities in all eleven natural regions.

ii. INSTALLATION OF THE WORKSHOPS

When there exists in a regional development project a possibility to accommodate researchers, as in the SRD-Buyenzi and the SRD-Kirimiro (where ISABU researchers are already installed), the workshop should be based there.

The advantages of being based within a project are:

- a measure of autonomy thanks to its statute which allows a greater flexibility in financial management and operation;
- reduction in installation costs due to the utilization of its infrastructure;
- utilization of its extension and training network, so that the workshop, at minimum cost, can benefit from the help of people directly involved in the rural areas, making it possible for information to flow from there to the researchers and vice versa;
- the possibility of an immediate transmission of the results obtained in the workshops to extension agents who are well equipped to promote their implementation;
- the possibility to resolve the problem of lack of coordination between research activities of ISABU and of the SRD's and projects, by a better mutual understanding of their respective roles and a more rational sharing of tasks.

iii. COMPOSITION AND SCIENTIFIC SUPPORT OF A RESEARCH WORKSHOP

To ensure that maximum use is made of the specialized knowledge and skills of all the ISABU staff in a supporting role, it is recommended that a workshop be limited to one or two researchers and a few technicians. The complexity of research in workshops requires highly qualified, but not necessarily specialized, staff.

Essential elements of the required profile for workshop staff, in addition to the specific qualifications, in relation to the chosen types of activities, are (see section 5.4(c)):

- a good general knowledge of agricultural science;
- ability to understand the farmer's logic ("put himself in the farmer's place");
- experience with agricultural practice and experience with farmers and extension workers;
- good interpersonal skills;
- management skills;
- a willingness to live in a small provincial town.

Regarding the last point, the option has been suggested that each staff member be at liberty to commute weekly between the workshop site and Bujumbura. This would create a big risk of causing the workshop to degenerate, with researchers spending more time in the capital than with the farmers. The team members should accept to live in a town situated in the region of the workshop.

iv. METHODOLOGY

Farmers' problems are identified through surveys conducted by the workshop staff, reinforced by other ISABU researchers, with the help of technicians and extension agents of the project. The SFSR project in Karuzi could provide methodological support in the diagnostic survey. The choice of priority themes for workshop research should be made in agreement with the host project, the researchers involved and, obviously, the farmers concerned. This choice must be reflected in the planning of ISABU's research activities, so as to determine which technologies are immediately transferable, and which must still be developed or improved. The director of the ISABU department responsible for the workshops could facilitate methodological training by organizing seminars and other meetings between different research workshops.

The identification of farmers' priorities confronts two major problems:

- the diversity and variability of constraints between farmers;
- the wide range of constraints which any farmer faces.

It is necessary to work with a sample of farmers that represents the variability in the region covered by the workshop, so as to address as well as possible the diversity in farmers' problems. On the other hand, it should still be possible to limit costs associated with this dispersion by judiciously choosing the places where the research will take place, in order to keep travel distances to a minimum. To confront the second problem, one must choose one or two major constraints, the removal of which will really make a difference to the farmer's economic and nutritional situation. In this regard, ISABU has shown that lifting a single constraint in the overall context of a farm can considerably improve the conditions of that farm (dairy production in the Bututsi, coffee in the Buyenzi, potato cultivation and storage).

v. CONSEQUENCES FOR THE RESEARCH ACTIVITIES GENERALLY IN ISABU

The fact that the workshop teams operating in the rural areas must be able to call on researchers based in stations or in Bujumbura requires that these researchers make time available, and notably that they include field activities in support of the workshops when they plan their research. Means of transport and a "field" budget need to be specifically earmarked for these activities. The researchers in the thematic programs will be even more in demand than the commodity researchers: Crop Protection, Soil and Water Studies ("Aménagement du Milieu"), Pre-extension, SFSR.

The need to evaluate the frequency, intensity, duration, and costs of the contacts that are indispensable for satisfactory operation of the workshops is another limiting factor to the early generalization of the workshop approach.

Finally, before designing the program of the research workshops, it is essential to clearly define the evaluation methods and criteria. Procedures for systematic monitoring are indispensable. They must take stock not only of results in the farmer's fields, but also of the development of relations with the researchers in other programs. The program data sheets ("fiches programme"; with workshops being considered as programs), which contribute to the clarification of objectives, resource needs and methods, will also facilitate evaluation.

The ISABU research stations should provide scientific backstopping to the research workshops in the same manner as ISABU headquarters in Bujumbura. Even so, a research workshop should remain totally independent from the stations located in the same region, in accordance with the proposals made earlier.

4. STRUCTURE OF ISABU

4.1 Stations and "Centres"

ISABU has six stations, ten "centres", and a few trial sites. Its main establishment at Bujumbura is commonly referred to as headquarters or general directorate, even though it accommodates a large number of scientific and technical staff, the library, and several important laboratories and other facilities.

Stations are loosely defined as locations for (field) research where there is a permanent presence of at least one researcher. "Centres" are large or not-so-large sites for experimentation and/or production of pre-basic seed and other planting material, characterized by the permanent presence of one or a few technicians. Trial sites are locations for experiments without any resident technical personnel.

In each category there is considerable variation in scope of mandate and size. Moreover, neither the stations nor the centres, nor both of these categories together, cover the diversity of the country's agro-ecological regions. Yet, the creation of additional stations is not envisaged, because of budget constraints and in the light of the proposed new research approaches (research workshops: chapter 3). Thus, the best approach is to be pragmatic and flexible about the utilization of this network, enlarging or reducing activities at each site as a function of needs, consistent with good planning of the ISABU program as a whole. Wherever a new activity can make use of an existing site, this is to be preferred over opening another site.

Recommendations

Until there is much greater clarity and unanimity concerning certain major areas of national and regional development policy (e.g., the entire animal production sector), and till there is more experience with the research workshop approach, it is impossible to make any well-founded recommendations regarding the expansion, or closure, of any of the ISABU units currently devoted to a single commodity.

It is important conceptually to make a clear distinction between the management of a research program and that of a station or centre. As long as a certain station or centre deals with only one program, it is efficient to leave its management in the hands of the person locally responsible for the program. But this should not be a barrier to using that same site for other research programs. Therefore, the director of a station or head of a centre should consider himself as the delegate of the Director General. The Committee of Directors ("Comité de Direction", section 4.3(ii)) is the appropriate body to watch over the appropriate utilization of all facilities for the ISABU program as a whole. The Scientific Commission (section 4.3(iii)) would have as one of its attributions the task to advise the Committee of Directors on these matters.

For stations or centres utilized for more than one program, the distinction in managerial responsibility becomes important. Because of the scarcity of researchers in ISABU, some of them feel that it would be better to appoint professional managers as directors of stations, rather than using researchers untrained for this task. This would have the advantage of leaving researchers available for full-time research. However, as has been found in many research institutions elsewhere, there is the risk that a manager unfamiliar with research may have little understanding of the special characteristics, priority needs, and constraints of agricultural research. His decisions, based on other criteria, might seem arbitrary and unjust or inadequate to researchers. This may lead to conflicts between administrators and research staff. It therefore seems preferable to choose as station chiefs researchers or senior technicians whose character and temperament predisposes them for a management role, supported by a competent administrative assistant, able to carry out most of the work, with little supervision.

The day-to-day management of the estate, including supervision of the labor force and maintenance of all experiments, should in the larger stations be in the hands of a specially trained technician.

In the centres, most of the above functions are inevitably in one hand.

4.2 Organization Chart

Until 1977 ISABU was organized according to stations and research projects. In that year, the creation of departments has led to a division of research activities according to a more classical structure (Plant Production, Animal Production, Plant Protection, Environment Studies ("Aménagement du Milieu"), Rural Sociology and Economy, and Administration), with only the largest department, that of Plant Production, subdivided into divisions (Food Crops, Perennial Crops, Forestry). Projects remained separate, under a single head (Annex 1).

A reorganization took place on the basis of a Presidential Decree in 1985, which reduced the number of departments to four (Plant Production, Animal Production, Support Services, Administration & Finance). Whereas this reduced the number of barriers, ISABU at the same time established a large number of formal divisions within each department (Annex 2). The largest department, Plant Production, further subdivided five of its six divisions into many groups and programs (Annex 3). The management of stations and centres is in the hands of directors under the authority of the Department of Administration and Finance.

Many researchers are critical of the large number of organizational levels, considering the small size of ISABU: departments, divisions, groups, programs, services. There is no good reason for such a complex organizational structure, which creates problems of communication and coherence. Moreover, there are flaws. For instance, it is by no means obvious that a unit dealing with soil survey and classification, pedology, fertilization, irrigation, and agricultural chemistry should be located as a division ("Aménagement du Milieu") in the Plant Production department. Moreover, it is wrong to regard some of the units in the Department of Support Services as having only a service role. Notably it is hard to see what service Rural Sociology and Economy, Biotechnology, and Mechanization could render without doing research.

It should be noted that only the departments have been established by Presidential Decree, and that decisions on all other levels of structure are within the purview of the Governing Council of ISABU.

The organization chart of an institution is a tool that must be adapted to specific needs. Thus, it should evolve. The desire to bring research closer to the rural environment which it is meant to serve implies the need for certain amendments to the present structure.

Recommendations

These structural modifications are suggested with the aim of simplifying the management of the various skills which are now unduly dispersed over many units in ISABU, and to do so in a research-for-development perspective.

There would be only two scientific departments, the Department of Commodities ("Département des Productions") and the Department of Environment and Production Systems Research ("Etudes du Milieu et des Systèmes de Production", EMSP). The first department would oversee and coordinate all the commodity programs, the second all activities dealing with the production factors, as well as the aspects of the physical and human environment.

The EMSP department would combine the soil conservation program of the present Agroforestry Research Unit (CRAF), the Environment ("Aménagement du Milieu") division, and some of the current "Support Services": Rural Sociology and Economy, Pre-extension, Mechanization, and Biotechnology (about which more below). This department would also supervise the "research workshops" (see chapter 3), as well as the Small Farming Systems Research unit (which itself might be converted into a research workshop). Agricultural Engineering, now part of "Aménagement du Milieu", would be combined with Mechanization. The Agricultural Chemistry Laboratory, also part of "Aménagement du Milieu", would become a separate unit. Considering their current activities, the Forestry and Agroforestry programs will logically be located in the Department of Commodities, but this should be done without impairing the management flexibility of the CRAF.

Below the department, there would be only one level, that of programs, each led by a program chief.

The EMSP department would thus comprise the following programs: "Aménagement du Milieu" (including all soils research, as at present), Soil Conservation, Socioeconomics, Pre-extension, Agricultural Engineering and Mechanization, Agricultural Chemistry (managing the Laboratory, but also participating in research), the Research Workshops, the reconstituted SFSR, and Food- & Biotechnology. The Soil Conservation program and that of "Aménagement du Milieu" would have studies on erosion control in common. In fact, there are numerous other opportunities for cooperation across program boundaries in this department.

No intermediate structural level seems necessary, as experience shows that a more or less arbitrary grouping of units often creates more problems than it solves.

The present departments of Plant Production and Animal Production show an enormous difference in size. This is a common problem, which agricultural research institutes in some other countries have resolved by either de-emphasizing the role of departments, or having no departments at all (maintaining only programs). The recommended Department of Commodities (the French name "Département des Productions" sounds more acceptable) -- a formula which several national research institutes in Latin America have adopted -- has the big advantage of removing the artificial cleavage between crops and animals. Within this department, there would only be programs based on commodities or groups of commodities, each with a program chief. According to the present situation these would comprise. coffee, tea, cotton, rice, maize, wheat/triticale, sorghum, cassava, sweet potato, potato, beans, peas, soybean, groundnut, horticulture, cattle (including animal health), pasture & forage crops, goats & sheep (FACAGRO), poultry, and forestry/agroforestry.

Grouping certain commodities would be possible but has few if any operational advantages, and the major disadvantage of placing an intermediate head between the program chief and the departmental director. Reducing the number of commodity programs would be desirable, so as to concentrate the existing resources on those regarded as of high priority. Especially the programs on tea, peas, soybean, groundnut, horticulture, and poultry might have to be reconsidered.

The Crop Protection program is a rather special case in that it could be located with equal justification in either of the two departments. On the one hand, the researchers in the Crop Protection program belong to specialized disciplines (plant pathology, entomology, virology, nematology...) which are represented mainly in the various ISABU commodity programs. From this point of view it would be entirely justified to group all specialists in these disciplines in the Department of Commodities. On the other hand, the development of research workshops implies an important participation of crop protection specialists in on-farm backstopping. Furthermore, ISABU has developed plans for a large-scale national inventory of crop pathosystems. These are arguments in favor of locating the Crop Protection program in the EMSP department. The mission has preferred this second option.

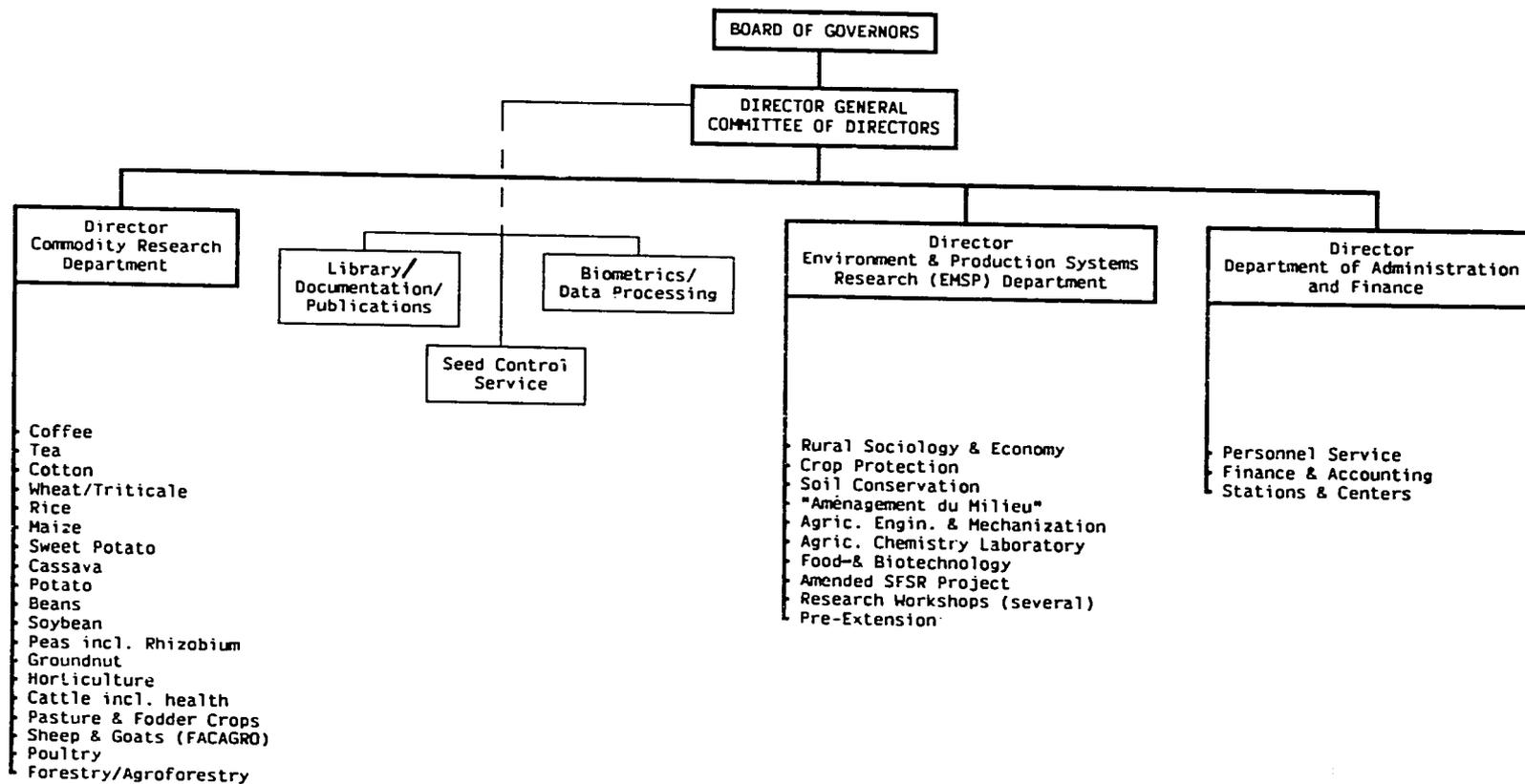
In both proposed departments, differences in program size would merely reflect (i) the importance of each program in relation to the development plan and (ii) the number of researchable issues.

The only anomaly in the proposed structure is the place of Food- and Biotechnology. This complex area needs to be developed, with initial emphasis on small- and medium-scale food processing. It does not fit logically into either of the two scientific departments. This is because it does not really belong in ISABU, but is only accommodated here for want of a more suitable institution in Burundi. Placing it in the EMSP department has the advantage of keeping it close to the Agricultural Chemistry Laboratory (with which it might initially be associated) and to the Agricultural Engineering and Mechanization program from which it might derive support in the medium term.

The present Department of Support Services, which, as noted earlier,

erroneously includes several laboratories which have a research role in addition to their important service tasks, would no longer exist as such. However, the Library/Documentation unit (with a Publications service added) and "Biométrie/Informatique", as well as ISABU's Seed Control Service (see section 9.2), would remain support services in the true sense of the word. Each of these would have a chief of service, and it is recommended that they report directly to the Director General.

Figure 1. RECOMMENDED ORGANIZATION CHART FOR ISABU



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The streamlined organizational chart on the next page (Figure 1), should greatly promote the development of functional relations between programs within a department, as well as interactions between research on individual commodities on the one hand and integrative research on the other. It supports the present call for closeness between research and its clients. It also simplifies lines of administrative and scientific communication, reduces paperwork and delays, and facilitates mechanisms and procedures for monitoring and evaluation, planning, and programming.

This simple structure will also facilitate the setting up of a system of cost accounting by research program, which would be a valuable tool in program evaluation.

A new departmental structure requires a Presidential Decree. When the Board of Governors of ISABU drafts an amendment to the Decree currently in force, it will wish to study whether any other clauses are in need of modification. This will certainly take some time. Meanwhile, ISABU can proceed with most other aspects of the recommended policy, notably by reorienting and, where necessary, reorganizing its programs and their relationships, to emphasize their role within the ISABU structure.

The importance of the two director posts in the management of ISABU cannot be overestimated. A brief profile for these posts is provided in section 5.4.

4.3 Consultative and Executive Committees

Certain formal structures are necessary for the good functioning of research, but their objectives and limits must be clearly defined. These structures are needed to:

- define the overall research policy of ISABU;
- define programs and their objectives;
- monitor program implementation against projections in logistic, financial and scientific terms;
- evaluate programs;
- evaluate researchers.

Recommendations

Existing committees will obviously be used whenever these are really well suited for the tasks to be assigned. Where this is not the case, new ones will be inevitable. The Board of Governors ("Conseil d'Administration"), the Committee of Directors ("Comité de Direction"), and the Scientific Commission ("Commission Scientifique" -- currently called Comité Scientifique) are clearly the first candidates for additional tasks, provided their respective roles, attributions, responsibilities, and mode of operation are better defined and well respected. Program Committees and a Promotion Commission ("Commission d'Avancement") are recommended new creations which should improve the scientific quality and relevance of research at ISABU.

i. THE BOARD OF GOVERNORS

Subject to Government instructions, the Board decides on research policy and program definition. But to enable it to do so, the Board must be guided and its work prepared through appropriate mechanisms which involve, as the case may be, the Director General, the department directors and program chiefs, the officials of MINAGRI, and representatives of development projects. The views of the Scientific Commission would especially constitute important inputs.

Among the attributions of the Board of Governors are its powers of decision on the recruitment and promotion of researchers. It is suggested that its decisions on promotion of researchers be based on recommendations of a Promotion Commission (see below).

ii. THE COMMITTEE OF DIRECTORS

This Committee, defined in the Presidential Decree of 1985, is made up of the Director General and the directors of all ISABU departments (according to the present recommendations, there would be three departments: of Commodities; Environment and Production Systems Research; and Administration & Finance). It has as its principal functions the implementation of the decisions of the Board of Governors, the daily management of the institute, and the overall supervision of the material, financial and scientific execution of the research programs.

This Committee would see to it that the financial and administrative management of the programs conforms with procedures and is in line with the orientations of research at ISABU. To enable it to fulfill that role, the Committee would have at its disposal the operation data sheets, subjected to the scrutiny of the departmental directors, and the records of the proposed computerized analytical accounting system.

iii. THE SCIENTIFIC COMMISSION

This Commission (which would replace the present Scientific Committee) would play a key role in the scientific functioning of ISABU. The growing importance of such a Commission is directly linked to the creation of research workshops and the concomitant changes in structure, research methodologies and inter-program cooperation. It would act as an advisory body to the Director General and, through him, the Board of Governors. This Commission would reflect on research priorities, and monitor and assess the orientation and scientific quality of programs. It might also be responsible for the scientific evaluation of all candidates for researcher positions at ISABU, both national and expatriate.

The mission intended to recommend that this Commission would also advise on the allocation of scholarships and stipends; the creation by ISABU of a Training Commission and the decision to appoint a Training Officer make this recommendation superfluous.

After implementation of the recommended departmental restructuring, the Scientific Commission might be composed of:

- the Director of the EMSP Department
- the Director of the Department of Commodities
- two or three persons chosen by the Director General of ISABU from among the scientific leadership of the different technical cooperation projects
- five senior ISABU researchers, each of whom would represent a group of program interests, such as:
 - (a) perennial crops
 - (b) annual crops
 - (c) animal production
 - (d) studies of the physical environment ("aménagement du milieu", agric. chemistry, food technology, agroforestry...)
 - (e) studies of the social environment (socioeconomics, research workshops, SFSR, pre-extension).

Initially, the Director General of ISABU would chair this Commission, but later he would relinquish his membership, and the chairmanship would then be taken over by one of the Department Directors. The special role of the five researchers would be to keep themselves informed of the programs which they represent, in order to be able to report to the Commission on results obtained and difficulties encountered.

The updated program data sheets and operation data sheets would be among the main sources of program information for this Commission.

The desirable frequency of meetings of the Commission cannot be estimated in advance. However, given the scope of its attributions, one meeting per month or every two months would be appropriate. One meeting should be scheduled before the meeting of the Board of Governors, at which the orientation of ISABU's programs is discussed in the light of evolving national research policy.

iv. PROGRAM COMMITTEES

The function of such committees -- one per major program -- would be to bring about a formal consultation between research, development, and national planning. The primary aim of a program committee is to help ensure that the objectives and needs of the potential users of research results are fully discussed and taken into account at the level of the researchers themselves. Committee meetings also serve to inform the researchers from first hand, and rapidly, of changes in technical and economic conditions that confront the program in question.

In this light, one of the most important activities of a program committee would be to comment on the program data sheets (see section 2.7(ii)), with emphasis on the specification of national objectives and major development thrusts, and the choice and justification of sub-programs and themes. The committee would also review the state of progress in the research, and discuss how adoption of its results by potential users can best be promoted.

Given this mandate, it is suggested that a program committee should have the following composition:

- the Chief of the research program concerned (Chairman);
- all researchers involved in the program;
- a technical officer of MINAGRI well acquainted with the commodity or subject area, including national planning objectives and targets, designated by the Director General of Agriculture or the Director General of Livestock, as appropriate;
- a technical representative of SRDs and projects, appointed by the relevant Director General of MINAGRI.

Where applicable, one might add a representative of the Ministry of the Environment. As far as possible, ministerial and SRD/project membership of different program committees should be assigned to different persons, in order to avoid overload, and to have as wide a representation as possible from these external partners in the work of ISABU.

Each committee should hold at least one scheduled meeting a year. Additional meetings may be held at the request of the Chairman or any of the external members whenever important sudden changes occur in the situation of the commodity (market situation, outbreak of a new disease...) or as a result of research results. The best time for the scheduled meeting is when the annual program-and-budget is being prepared and the program data sheets and operation data sheets are updated, preferably before the start of the agricultural season. The new annual program should take into account the evaluation of last year's results carried out by the Scientific Commission.

v. THE PROMOTION COMMISSION

In the context of the "Règlement d'Ordre Intérieur du Personnel Scientifique", it would be necessary to envisage a Promotion Commission. Its role would be (a) to lay down criteria and standards to be used for the evaluation of personnel in the different scientific grades, and (b) to decide -- subject to endorsement by the Board of Governors -- on promotion of researchers, based on an assessment of their aptitudes and the scientific quality of their research work as evidenced by their file and an oral presentation. The Commission would also decide on the minimum period before another presentation can take place, for those candidates who are not accepted for promotion.

This proposition needs the approval of the Board of Governors.

The Promotion Commission could have the following permanent members:

- the Director General (Chairman);
- the Director of the Department of Commodities;
- the Director of the EMSP Department;

and would be strengthened by a few invited members, such as the candidate's chief of program (does not apply to program chiefs themselves).

This Commission would hold at least one session each year, but more if there is a large number of candidates for promotion in a given period.

5. MANAGEMENT OF HUMAN RESOURCES*

The management of human resources occupies the first place among all the problem areas cited most often in ISABU, both by the research leaders and the researchers.

5.1 Qualifications of Scientific Staff, and Recruitment Problems

Of the total scientific staff (86 persons, nationals and expatriates combined), 13% have a doctorate (most of these are expatriates), 66% have an "ingénieur agronome" or "maîtrise" or master's degree (a higher percentage among the expatriates than among the nationals), and 21% have only a "licence" or "ingénieur technicien" diploma (all but one being Barundi), as Table 1 shows.

Table 1: DISTRIBUTION OF RESEARCHERS IN ISABU BY LEVEL OF EDUCATION
(MARCH 1988)

	<u>Nationals</u>		<u>Expatriates</u>		<u>Total</u>	
	Number	%	Number	%	Number	%
Doctorate	2	4	9	23	11	13
Ingénieur/Maîtrise/MSc	29	61	28	74	57	66
Licence/Ing.technicien	17	35	1	3	18	21
Total	48	100	38	100	86	100

Most "ingénieurs agronomes" and licentiates are graduates of the University of Burundi. This young university provides a general curriculum in agriculture that is meant to correspond with the country's needs for staff training. But as regards personnel for research, there is no specific training at all to prepare the students for this type of work.

The selection that takes place in the Faculty of Sciences and the Faculty of Agriculture produces ingénieurs agronomes of acceptable calibre, but ISABU has been unable to get hold of the most competent ones for research. However, this is due more to the students' own preference than to the process of assignment per se. Although the university and the projects get priority in filling their allocated posts, there is also the undeniable fact that the young graduates have preferred a job in the University, or in an SRD or project (which last two categories pay better), or in one of the ministries, over a job in ISABU. This has made it impossible for ISABU to practise any positive selection for competence and research aptitude. Only the future can tell whether the 15% salary rise recently awarded to all ISABU personnel, and/or other stimulating measures, will attract more young graduates to the institute.

* Because of its special importance, training is dealt with separately (chapter 6).

It should be noted that ISABU has been unable to fill all its existing researcher posts, and that a cooperation of substitution has developed in order to make up for the staff shortages.

In the aggregate, the distribution of qualifications in Table 1 is not too unfavorable, although the proportion of researchers with a doctorate is too low. However, the situation is highly unsatisfactory when one looks at the national researchers. Only two of them have a doctorate.

More than one-third of the national researchers possess only a first degree or a higher technician's (A1) diploma. Moreover, the "ingénieur agronome" or "maîtrise" degree which many of the other 61% hold is in many cases an unspecialized diploma; most of these graduates lack training in research methodology, and have not had the benefit of practically oriented training in experimental design and statistics. Thus, very few national researchers have a sufficient qualification for independent research, and ISABU possesses at present a very limited capacity to provide scientific leadership. Therefore, the functions of research management and program supervision in many areas will have to be exercised by technical assistance staff for some time to come.

This requires that expatriate staff be recruited according to well-defined and mutually agreed criteria, permitting the selection of persons having a profile that corresponds to the specific job requirements. In particular, the recruitment of expatriates with the same qualification and sometimes less experience of Burundi's real problems of agricultural development than have national researchers is of limited value to the country.

Recommendations

At ISABU's own initiative, several measures can be taken to strengthen ISABU's scientific potential:

- Carefully scrutinize the level of qualifications of the researchers, both national and expatriate, before their recruitment.
- Recruit in the first instance at least the personnel needed to fill the existing national posts currently occupied by expatriates.
- Develop further the participation of ISABU researchers in the teaching at FACAGRO, notably by establishing a course or series of seminars on "introduction to research and its methods". Such a course would enhance the students' scientific inquisitiveness. It might also induce more of them to opt for a "stage" at ISABU during their studies, and perhaps a research career. The course leader, carefully chosen, would be able to detect suitable candidates at an early stage and stimulate their interest.
- In collaboration with FACAGRO, increase the number of student theses ("mémoires) on ISABU research themes and supervised by senior ISABU researchers.

- Increase the awareness of the Public Service Ministry that ensuring the quality of agricultural research has a high national priority, and that it can only be met if ISABU is endowed with high-calibre staff. These researchers, moreover, will benefit the most from the additional training which external cooperation agencies are willing to finance for ISABU staff.
- In collaboration with all its technical cooperation partners, make a much more determined and systematic effort to provide advanced specialized training for its staff. This is further developed in chapter 6.

5.2 Distribution of Staff between Headquarters and Stations

The distribution of researchers and A2-level technicians between Bujumbura and the experiment stations is as follows:

Bujumbura:	48 nationals and 21 expatriates
Stations:	51 nationals and 17 expatriates.

These figures show that more than 50% of all scientific and technical staff, both national and expatriate, are at ISABU headquarters. More comfortable living conditions in Bujumbura, rather than the exigencies of the job, certainly explain this phenomenon, especially since the living conditions in the stations are at times deplorable and offer little inducement to live there.

Recommendations

ISABU will have to use objective criteria to decide the necessary staffing of its stations -- and of its research workshops. If, as is almost certainly the case, more researchers should be outposted, ISABU will have to improve the working conditions at the stations, and perhaps create some secondary benefits. It will have to pay special attention to the problem of housing, as well as to the problems of researchers whose families will have to stay in Bujumbura for personal reasons (work, studies, children's education...).

It will need a determined new policy for the management of its human resources, based on a revision of the policy currently in place. The likely need to decentralize its staff is probably ISABU's most formidable challenge in implementing its new research orientation.

5.3 Technician/Researcher Ratio

The technician/researcher ratio in ISABU is slightly over 1 if one includes the A3-level technicians. Without them, the ratio is only 0.6. As a result, many researchers have no choice but to spend part of their working hours or leisure time on activities that should not be theirs, and this reduces the time available for research proper.

Recommendations

ISABU should develop a more attractive career structure for research technicians, notably with regard to financial rewards. This should be accompanied by recruitment of more A2-level technicians and, in collaboration with donors, the development of a long-term plan. This plan would provide:

- more opportunities for advanced training abroad as a reward for outstanding performance in the context of a career plan for field technicians;
- a special scheme for training laboratory technicians abroad.

5.4 Job Descriptions

Recommendations

Recruitment for key positions should be based on a sufficiently detailed job description and statement of required qualifications to permit a proper assessment of candidates against verifiable criteria.

Draft job descriptions are provided here for the posts of director of the recommended departments of Commodities and EMSP, and for the post of head of a research workshop.

i. DIRECTOR OF THE DEPARTMENT OF ENVIRONMENT AND PRODUCTION SYSTEMS RESEARCH (EMSP)

Appointment to this post takes place by Presidential Decree, and therefore independently from ISABU. Nevertheless, the following specifications should be firmly taken into account in the selection of the candidate:

Qualifications:

- Scientific level: doctorate or equivalent, at the rank of "Directeur de Recherche";
- At least seven years of experience in agricultural research and/or development relevant to Burundian conditions;
- Familiarity with the methodologies of farming systems research;
- Awareness of the importance of an in-depth understanding of farming practices and farmer motivations;
- Openness to the "research workshop approach" to reorient ISABU research;
- Proven scientific leadership qualities;
- Excellent interpersonal skills;
- Knowledge of English highly desirable.

Activities:

- Watch over the scientific quality of research in the department;
- Assure the coordination between research workshops and thematic research programs in the department;

- Assure the transmission of information on problems and needs in the rural areas and the research workshops, to the Director of the Department of Commodities and the Director General;
- Develop and manage an appropriate system of monitoring and evaluation for the activities of the department;
- Develop communication, dialogue, and collaboration between programs where this improves efficiency or relevance;
- Participate in various commissions (Committee of Directors, Scientific Commission, Promotion Commission...);
- Coordinate the preparation of annual programs and budgets for the department;
- Promote external contacts for staff of the department;
- Promote the publication of research results in different forms adapted to the various categories of clients: extension agents, scientists, policymakers;
- Organize training and information seminars.

ii. DIRECTOR OF THE DEPARTMENT OF COMMODITIES

As in the case of the previous post, appointment to this position also takes place by Presidential Decree, independently from ISABU. Similarly, the following specifications should be firmly taken into account in the selection of the candidate:

Qualifications:

- Scientific level: doctorate or equivalent, at the rank of "Directeur de Recherche";
- At least seven years of experience in agricultural research relevant to the conditions of Burundi;
- Awareness of the importance of an in-depth understanding of farming conditions and farmer motivations in Burundi;
- Openness to the "research workshop approach" to reorient ISABU research;
- Proven scientific leadership qualities;
- Good interpersonal skills;
- Knowledge of English highly desirable.

Activities:

- Watch over the scientific quality of research in his department;
- Develop and manage an appropriate system of monitoring and evaluation for his department, in consultation with the Department of EMSP;
- Develop communication, dialogue, and collaboration between programs where this improves efficiency or relevance;
- Provide information to the Director of the Department of EMSP;
- Participate in various commissions (Committee of Directors, Scientific Commission, Promotion Commission...)
- Coordinate the preparation of annual programs and budgets for the department
- Promote external contacts for staff of the department;
- Promote the publication of research results in different forms adapted to the various categories of clients: extension agents, scientists, policymakers;
- Organize training and information seminars.

iii. HEAD OF A REGIONAL RESEARCH WORKSHOP

Qualifications:

- Scientific level: doctorate or equivalent, at the rank of "Maître de Recherche";
- Very good general knowledge of agricultural science;
- At least five years of practical experience in agricultural field research involving contact with farmers and extension and/or development agents, and relevant to the conditions of Burundi;
- Mastery of methods of production systems research and their application to the "research workshop" approach;
- Proven ability to manage a research program and a research team;
- Excellent interpersonal skills;
- Knowledge of Kirundi desirable.

Activities:

- Carry out diagnostic surveys in collaboration with the most experienced researchers of ISABU;
- Define the priorities for his program, in consultation with researchers, extension agents, and farmers;
- Assure the coordination between the field activities of the research workshop and the activities of researchers in the thematic and/or commodity programs;
- Watch over the use of appropriate research methods and protocols;
- Assure the transmission to the director of the Department of EMSP of information concerning problems and needs of the rural areas and the research workshops;
- Develop contacts with colleagues of the other research workshops;
- Participate in various commissions (Scientific Commission, Promotion Commission, Comités par programme...);
- Coordinate and execute the preparation of the annual program and budget for his research workshop;
- Promote the publication of research results in different forms adapted to the various categories of users.

5.5 Grades and Promotion of Scientific Personnel

The current ISABU statute and corresponding regulations ("Règlement d'ordre intérieur du personnel", July 1987) make no distinction between the grades of researchers and the functions they might hold: see Table 2.

Table 2: PRESENT GRADES OF SCIENTIFIC PERSONNEL AND CORRESPONDING LEVELS OF EDUCATION IN ISABU (FROM: "REGLEMENT D'ORDRE INTERIEUR DU PERSONNEL", JULY 1987)

<u>Nomenclature of Grades</u>	<u>Level of education</u>
1. Adjunct Research Assistant	Licence, Ing.Tech., Ing.Industr.
2. Research Assistant	Ing.Agro., Ing.Zoot., Méd.Vét.
3. Chief of Research Program	Special post-university diploma
4. Chief of Research Division	Doctorate
5. Chief of Research Department	Advancement by seniority
6. Adjunct Director of Research	" " "
7. Director of Research	" " "
8. Research Administrator	" " "

This system of grades is almost entirely administrative, and grades 3-5 (and perhaps 6-8?) are linked directly to a series of functions in the ISABU management hierarchy. Grades 3 and 4 are linked to specified (minimum) levels of education. For grades 5-8, the qualifications required are quite unclear. "Advancement by seniority" can be interpreted in many different ways, and whether a doctorate is required remains unstated. Furthermore, how is it decided at which "grade" a new senior appointee is recruited, and how does one move from 4 to 5?

These grades do not provide researchers with any promotion structure linked to their academic and scientific achievements. For instance, persons with a doctorate cannot all become Chief of Division (even assuming that divisions would continue to exist). The present system thus has certain features which cause promotion to be a process that is independent from the scientific merit of the individual. A real system of scientific grades (as distinct from posts) is therefore a high-priority requirement if ISABU wishes to provide a career path for its scientists. These scientific grades should, of course, be linked to salary increases, as is the case with the posts in Table 2.

Finally, it may be noted that the current personnel assessment system is far too arbitrary in its application to permit a real evaluation of the quality and aptitude of a researcher and his eligibility for a higher rank. This, too, is a purely administrative assessment system, based on supervisors' opinions, which is inadequate for a proper evaluation of scientific staff.

Recommendations

A system of scientific grades is proposed in columns (1) through (4) of Table 3. This system must be accompanied by criteria and standards to be applied in evaluating staff. The mission has not proposed specific criteria because it feels that these should be determined within ISABU, allowing if possible the staff directly concerned to express their views.

Table 3: RECOMMENDED SCIENTIFIC RANKS, CONDITIONS FOR ATTAINING THEM, AND THEIR RELATIONSHIPS TO POSTS IN THE RESEARCH HIERARCHY.

Scientific Grade (1)	Level of Recruitment (2)	Minimum time in grade f) (3)	Probation period a) (4)	Accessible function (5)	Decision by: (6)
Adjunct Res. Assistant (ARA) 1st Category	- Licence - Ing.Tech.	2 years 2 years	1 year 1 year	Res.Operation Assistant	Progr.Chief + PC ^{c)}
Adjunct Res. Assistant (ARA) 2nd Category	- Maîtrise ^{b)} - Ing.Agro/Zoot. - Méd.Vét.	2 years 2 years 2 years	1 year 1 year 1 year
Research Assistant (RA)	- ARA + oral test - Specialized MSc or specialized Ing.Agro ^{b,e)}	3 years 3 years	-- 1 year	Res.Operation Assistant	Progr.Chief + PC
"Chargé de Recherche" (CR)	- RA + oral test - Doctorate	4 years 5 years	-- 1 year	Res.Oper.Chief/ Subprogr.Chief	Progr.Chief + PC
"Maître de Recherche" (MR)	- CR + oral test	5 years	--	Program Chief	Director of Dept + PC
"Directeur de Recherche"(DR) ^{c)}	- MR + oral test	-	-	Program Chief/ Director of Scientific Dept.	PC + Minister

- a) The period of probation is included in the minimum number of years in a given grade before promotion, so does not lengthen the effective period.
- b) Following the value attributed to this diploma by the "Service d'Equivalence des Diplômes" in Burundi.
- c) The grade of "Directeur de Recherche" here is a scientific grade and should not be confused with the position of Director of ISABU or any of its departments.
- d) PC = Promotion Commission ("Commission d'Avancement", recommended in this report, and which along with other functions determines the promotion criteria).
- e) The higher grade which these specialized diplomas confer (by comparison with that of Adjunct Research Assistant) is justified only in those cases where the recruited candidate is assigned to a post that corresponds to his area of specialization. These specialized diplomas can be, for example, an American M.Sc. in soil science with a thesis in soil fertility, or one in plant pathology with a thesis in virology, or a French Ingénieur Agronome diploma with a final year of specialization and a research thesis, as mentioned for the M.Sc. above.
- f) This provides an indication only. The actual minimum duration will depend on the promotion criteria that will be determined by the Promotion Commission.

To lay down these criteria is one of the attributions of the proposed Promotions Commission. Column (5) illustrates how it would be possible to harmonize the scientific grades with specific research and research management functions in ISABU, up to the level of department director. Column (6) shows which authorities would conduct the evaluation and decide on promotion.

Column (1) shows the different grades, and column (2) the required qualifications. These can, for the lower grades up to and including "Chargé de Recherche", consist of a higher academic degree, but there is also an alternative pathway. At any grade from Research Assistant upward it is possible to accede to the next higher grade on the basis of the positive outcome of an oral examination conducted by the Promotion Commission (see section 4.3). This means that, beyond the minimum diploma required to enter ISABU as a researcher (Licence, Ingénieur Technicien (A1), Ingénieur Agronome/Zoottechnicien, Médecin Vétérinaire), it is possible in principle to proceed up to the highest rank over a minimum period of 16 or 14 years (column (3)). If proper criteria are set and standards applied for the oral tests at each level, this flexibility does not impair scientific standards, and it leaves it open for very able and hard-working researchers under good guidance to develop themselves. It also means that those who do not get a scholarship for advanced studies (abroad) can find any number of other ways to perfect themselves. In practice, of course, as has been stressed earlier, it is absolutely essential -- also to provide adequate guidance to less experienced researchers -- for ISABU to aim for at least 20% of its national staff to have a doctorate, and for at least another 40% to have a specialized M.Sc. or equivalent degree.

Column (4) indicates where a 1-year probation period is required. This probation applies to persons newly recruited (at a grade corresponding to the highest academic qualification he/she possesses). It also applies to persons who return to ISABU from studies which have led to an advanced degree. If, for instance, an "ingénieur agronome" leaves for advanced studies after his probationary year, and returns a few years later with a doctorate, he will immediately become "Chargé de Recherche", but the first year is regarded as a probation period. Should he disqualify at the end of that year, his appointment with ISABU ceases if the reason for disqualification is serious. If he is allowed to stay at ISABU, he would be confirmed in the grade he would have had without his advanced diploma, in this case that of Research Assistant. A fresh recruit who fails his probationary year would always be dismissed.

Persons who have research experience, or relevant development experience, would be evaluated taking this into account, and they might enter ISABU service at a higher grade than their academic diplomas alone would justify. However, it is recommended that they should in all cases be on probation for one year.

Obviously, the success of the recommended system of grades in raising the level of competence and motivation of the ISABU researchers will depend far more on the standards applied by the Promotion Commission than on precise formal rules.

Column (6) shows which authorities would decide on promotion in grade. Up to and including the grade of "Chargé de Recherche" the Program Chief would present his views in writing to the Promotion Commission (of which he himself is an invited member for the case under consideration), which will decide according to the procedure described in section 4.3. For the grade of "Maître de Recherche" the procedure is the same except that it is the Director of the Department concerned who would present his written views to the Commission. For the highest grade, the Commission examines the case on the basis of the usual procedure, but then would present a detailed recommendation to the Minister, who decides.

Column (5) shows how the scientific grades could correspond with specific levels of responsibility in research, and in research management. The researchers in the two lowest grades should participate in but would not be responsible for research operations as defined in section 2.7(iii). This responsibility would be reserved for persons in the grade of "Chargé de Recherche". For the most able among them, this responsibility could extend to entire themes or even sub-programs. It requires a more experienced scientist to take charge of a whole research program; this is reserved for the "Maîtres de Recherche" and the "Directeurs de Recherche". The Directors of the scientific departments would be chosen from among the latter.

The research leaders mandated by Presidential Decree, i.e. the Director General of ISABU and the Department Directors, should be remunerated at least at a level corresponding to the grade of "Directeur de Recherche" in Table 3.

5.6 Stability and continuity of senior staff

Maintaining a steady course in ISABU and the implementation of its research programs demands the guarantee of a certain stability in the assignments of senior staff. A rapid turnover of directors, as has occurred in recent years, does not facilitate the implementation of a consistent research management policy.

Two main causes can be identified for an excessive mobility of these senior staff: individual causes -- more attractive working conditions elsewhere -- , and institutional causes -- appointment to posts outside ISABU.

Improvement of the conditions and statutory position of these staff is essential to really motivate them for their heavy responsibilities. It will give them a more favorable environment and will limit resignations. Moreover, ISABU should develop a policy of staff assignments specifically linked to the programs which are of high priority to the country, so that the Government is committed to leave staff in post so as to strengthen the quality of the research programs.

5.7 Sanctions

The existing regulations of ISABU contain an adequate range of possible disciplinary sanctions for mediocre research performance and personal

misdemeanor. So far, these sanctions are not being applied, although in certain cases they might have been justified.

An expressed desire to improve the functioning of ISABU loses much of its credibility if necessary measures are not taken in respect of people who do not fulfil their mission through ill-will, negligence, or incompetence.

Experience shows that even a single person can severely damage the impact of a collective sense of dynamism. Even so, the existence of sanctions does not imply that the research environment should be constraining or coercive. The able and diligent researcher must feel that he/she is in a favorable environment, which is not the case if incompetent colleagues enjoy the same advantages. This implies that ISABU should have both rewards and sanctions. In certain cases, as specified in the current regulations, ISABU should not shirk from dismissal.

6. TRAINING

6.1 Current Situation

The problems of training require special attention in ISABU. Training needs are considerable, as the observations made in previous chapters show. Many national researchers have very little, if any, training in research methodology; few laboratory technicians have received adequate formal training. Despite these needs, training -- especially for higher degrees -- has been rather neglected by the ISABU leadership, and by certain technical assistance agencies.

Between programs, there are large differences in training opportunities for technicians and researchers. Some of the international agricultural research centers (IARCs) have technical assistance projects in ISABU; in this context they have training budgets which, together with extensive international contacts, provide very good training opportunities for the researchers and technicians working on the (food) commodities concerned. Those programs that do not benefit from such type of support often lack opportunities for advanced training, not so much from an absence of scholarships -- which some bilateral donors might be willing to supply -- but from a lack of suitable institutions. Industrial crops are a case in point, much to the frustration of the affected researchers.

Some bilateral donors provide long-term scholarships for studies overseas leading to advanced degrees. Certain technical assistance organizations have been averse to providing scholarships for advanced degrees on the grounds that this does not always have the desired result. In particular, they are afraid that trained researchers might choose, or could be assigned to, other posts after their return, so that the training received at great expense does not benefit ISABU.

Attempts are now being made on all sides to construct training formulas that enhance relevance and efficiency. The number of scholarships has increased in recent years. Some efforts at providing training opportunities have been poorly planned and coordinated, so that several programs have been disrupted by the sudden departure on training of national researchers. This has alerted both donors and ISABU to the fact that the institute urgently needs a formal training plan.

6.2 Recommendations

i. TRAINING IN BURUNDI

Local training, through short courses, seminars, and intensive on-the-job guidance, can act as a catalyst to the desired reorientation of research. It can help the researcher acquire a more critical attitude toward the ultimate goals of his/her research and a better understanding of the conditions that will have to be satisfied for results to be adopted.

In particular, the researcher must become better acquainted with, and more sensitive to, the socioeconomic dimensions of his client's problems.

In particular, the researcher must become better acquainted with, and more sensitive to, the socioeconomic dimensions of his client's problems. If he learns to be more conscious of the role of research as a pillar of development, he will pay greater attention to the orientation of his research and choice of methods.

Orienting research to direct work in the rural areas poses new problems of methodology. Part of the training should therefore be aimed at discerning what methods to use for a variety of off-station conditions, and how to reach the most meaningful results with the greatest simplicity. This is beyond the present capacity of the University of Burundi. It should therefore be undertaken at ISABU, which might also help the Faculty of Agriculture to strengthen its curriculum by including at least one course in research methodology.

Training seminars can be held by consultants who visit ISABU on missions. For the most experienced researchers of ISABU (expatriate and national), participation in training should be written into their job description. A crucial corollary is that their performance in this respect should receive considerable weight in their evaluation. In respect of expatriate researchers, such measures require the explicit backing and collaboration of the cooperation agencies concerned. But it will be the primary task of the ISABU directorate and the researchers to develop a feasible plan together, with each researcher contributing according to his special expertise.

This approach demands that experienced researchers study particular subjects in such detail that they can communicate their knowledge to others. Thus, training is a powerful tool for creating better scientists. It greatly stimulates consultation of the library and of colleagues within the country, and also of institutions abroad. Once such a pragmatic approach to training is adopted, ISABU will be able to make much better use of scientific and technical cooperation, including a better integration of training overseas into the overall improvement of the institute.

ii. TRAINING ABROAD

In the situation of Burundi, scholarships for advanced training abroad are the principal basis for training researchers, as the University of Burundi is unable to provide such training.

Short- and long-term scholarships have complementary functions, but a large proportion of the national researchers (say 60%) should obtain a specialized M.Sc. degree or equivalent. This should be based on a combination of research and coursework. The strongest 20% should be encouraged to then go on for a doctorate.

While registering at foreign universities, it is highly desirable that the research be done in Burundi, so that (a) young researchers do not become alienated from their own environment, (b) training of Burundi makes a contribution to the knowledge of specific local rather than host-country problems,

(c) the problem of replacing the staff being trained would be reduced or eliminated, because the trainees would be abroad for shorter periods, and (d) family problems would be alleviated.

To make this possible, joint supervision arrangements between professors of the overseas university and professors from the University of Burundi and/or senior researchers at ISABU should be designed, as is happening in other African countries. It is desirable for all parties in such cases if arrangements are made, to maintain the researcher's affiliation to ISABU, so that it will be possible to bond him/her to the Institute for a specified period (5 - 10 years, depending on the duration of training).

Overseas long-term training must be carefully planned and scheduled, in cooperation with all the external agencies involved in ISABU, to minimize disruption of the research programs. However, all parties, including the technical cooperation agencies helping ISABU in its research, should recognize that temporary disruption is less harmful than long-term stagnation of national research capacity.

Therefore, all scholarships proposed by cooperation agencies should be taken up, provided they give access to training that is recognized for its quality and relevance. While it may be true that many Burundi researchers have a somewhat weak scientific basis, a policy (whether ISABU's or a donor's) of not sending them for advanced training on those grounds is not in the country's long-term interest. It is up to ISABU's directorate and leading scientists to organize the preparation of a complete inventory of all research capacity in the institute, and to specify who will and who will not qualify for advanced training abroad. The comments of the researchers concerned and of their supervisors should be sought and taken into account. When this information is available, a tentative timetable should be prepared and discussed with donors, preferably at a round-table.

The Belgian Technical Cooperation (AGCD) has a particularly active role to play in training, because it must rely on able and dedicated Burundi researchers to safeguard the ultimate usefulness of its enormous investments in ISABU over more than 25 years. It is encouraging to note that the AGCD is now making both short- and long-term scholarships available, and it might be asked to increase the number. The apparent willingness of AGCD, when granting scholarships, to consider financing studies outside Belgium in disciplines where Belgian universities are not so strong is setting a particularly laudable example.

Also important for Burundi's future is a much stronger opening into the anglophone world. In this context, ISABU's efforts to utilize all scholarships offered by USAID should be applauded. Scholarships from other sources are needed also, particularly in areas where university or research institutions of other countries have a strong comparative advantage.

It is the task of the Government of Burundi, and of the ISABU Director General, to ensure that donor interests in supporting training of ISABU staff are coordinated, matched, and utilized to the country's best advantage. It is also their task to ensure, jointly with the funding agencies, that any English-language training needs are met efficiently.

To solve the problem of English training for researchers at the stations it is proposed that ISABU seek the assistance of the volunteer services of different countries; volunteers could live at the stations and give regular courses, which the researchers would be expected to attend.

The loss of national "counterparts" who leave for training or take up other posts is discouraging to the expatriates directly concerned. However, the technical assistance agencies themselves recognize that transfer of trained people to other, often superior, jobs does not mean that the impact of the training is lost to the country's economy; in quite a few cases the transfer can actually be regarded as a tribute to the training received. If donors wish to help Burundi overcome the shortages in qualified staff at ISABU, they have no option but to provide opportunities for training more than the numbers ISABU requires. This does not differ from what happens in industrialized countries.

A necessary corollary to such generosity must be that the Government and ISABU create conditions such that staff members return and stay for a reasonable period. To avoid losses of able staff, of which ISABU has suffered from time to time, it seems advisable for the Government now to introduce a contract system, requiring returning staff to serve ISABU for at least a period of time equal to that which they have spent abroad on training, at a rather severe penalty. The Government itself should of course show the greatest restraint in transferring people out of ISABU.

To the extent possible, researchers leaving for extended training should be replaced, to assure research continuity. This evidently poses problems for ISABU management because of the scarcity of immediately productive candidates, and the obvious need to have them in post several months before the trainee's departure, so as to assure an effective handing-over. Moreover, additional recruitment has budgetary consequences which also must be taken into account.

iii. THE PLANNING OF RESEARCHER TRAINING

Apart from attempts at recruitment, sharp priority setting and good planning and programming of training are necessary to avoid disrupting a great many research activities. This planning must in any case be based on the manpower requirements arising from a well-defined policy of planning the different research programs.

A training plan should take into consideration:

- the number of scholarships available from technical cooperation agencies each year (they should be asked to give forecasts);
- the disciplines that have a priority need for highly trained staff;
- the state of progress of research programs and operations, in order to find the least disruptive moment for staff to leave;
- the merit of researchers, as determined with a new system of personnel evaluation and modified criteria;
- the ability of the university to provide replacement staff, so as to fill holes in essential ISABU activities;
- the projected date of return and reintegration of returning researchers.

For this last point, certain rules must be observed. First, ISABU must follow the student's progress, both to stimulate his sense of belonging to the institute and to know his date of return with maximum precision and well in advance. Second, if the student is under contract, ISABU should be able to count on his actual return. Third, in the absence of such a contract, the researcher and ISABU should reconfirm their mutual interest, and the responsible Ministry should guarantee integration into ISABU at least a year in advance. Without it, no research programming is possible. This shows clearly that managing a training plan is an integral part of personnel management as well as program management.

Scholarships should take family conditions into account. In ISABU, researchers must provide evidence of their interest in research before being eligible for training. This means that many of them leave when they already have a family. For obvious reasons, prospective students should be strongly encouraged to take their family with them. Several donors recognize this and structure their scholarships accordingly. For those that do not, which regrettably includes USAID, it seems to be more a matter of a contrary policy than of an added financial burden, as most of the additional cost of living would be borne by the student, who would manage his stipend accordingly.

Among the many subjects in which training is particularly urgent are rural sociology and agricultural economics. In fact, apart from the two expatriate economists, there is only one national researcher in this field in ISABU, and he himself needs additional training. But other people need to be trained as well, because the present small team cannot assure the continuity and urgent progress in the social science disciplines, which must develop strongly, especially in the context of (i) the desired reorientation of research, and (ii) the growing need for ISABU to provide information useful to national planners.

iv. TRAINING OF TECHNICIANS

Whereas local institutions are adequate for the training of field technicians at various levels, no facilities exist for laboratory technician training. Given the fact that the present technicians do not understand English, the few relevant training opportunities in anglophone African countries (e.g., Kenya) are closed to them. Apart from on-the-job training, a few technical assistance agencies have funded participation of ISABU technicians in specialized training courses overseas. This is extremely valuable, and should be used as a career building instrument.

The creation in Burundi of a regional training facility for laboratory technicians under the auspices of the CEPGL might constitute a solution.

7. INFORMATION MANAGEMENT

Information management, in the context of agricultural research, must play several roles:

- Provide researchers with access to scientific information regarding those research activities worldwide that are the most relevant to the country's needs;
- Assure the exchange of information between researchers and potential users, notably farmers and extension agents;
- Facilitate communication between the research services and the national planning authorities;
- Develop internal exchange and circulation of all information useful for the scientific and administrative functioning of the institution;
- Diffuse the results of national research among the international scientific community.

7.1 Circulation and Exchange of Information at ISABU

Many researchers, especially the most isolated ones in the stations, are not really informed of what happens in the research programs in general. The only communication of information between programs that exists is mostly the result of informal contacts between people who have common scientific interests or personal links. The annual report is a good vehicle of scientific information, but its low periodicity obviously makes it impossible for researchers to follow progress of colleagues and assimilate results as soon as they have been obtained. Many of the ISABU research reports are not a very adapted means for this purpose either. There are no rules or guidelines for the organization, length, emphasis, and layout of publications, and their form of presentation varies enormously. Certain publications are particularly voluminous and hard to digest. Whereas certain researchers produce many reports and articles, at the other extreme there are some who produce none whatsoever, although their work would perhaps merit a wider diffusion.

Senior researchers, both expatriate and national, under pressure to produce publishable scientific results, and often charged with managerial tasks as well, do not spend much time in transferring their knowledge to junior colleagues. This is particularly serious, as coaching and apprenticeship is probably the most effective way to build a competent and coherent body of researchers.

The exchange of information between ISABU and its environment is very weak. Researchers receive inadequate information on the utilization of their research results and the problems encountered in their application. Criticisms of ISABU voiced by the leaders of agricultural development in Burundi indicate that they know only partially what problems this Institute must face, and what results there are.

Foreign exchanges are good for researchers working in programs supported by international research centers, and for expatriate researchers who have built up their own professional contacts overseas. The situation is

unfavorable, however, for many of the Barundi researchers, especially the younger ones. Their scientific information must come mainly from the (very deficient) library and documentation system (section 7.2). Finally, while some commendable efforts are made within ISABU to provide information to the extension services and the Barundi public at large, this effort receives far too little attention and support.

Recommendations

i. THEMATIC MEETINGS

Circulation of information should not take place only within programs but must extend across scientific activities, in the perspective of a more integrated approach to research. Thus, meetings on a problem theme, across programs or by area of specialization, can greatly enrich the researchers' experience and understanding. This should then be reflected in a favorable effect on the research programs. If not, they are a waste of time.

ii. KNOWLEDGE TRANSFER

Knowledge transfer is a special obligation of all senior researchers, especially the expatriate researchers, toward the development of a national scientific potential. The need for these researchers to participate in providing training has already been stressed (section 6.2). It is clearly a matter for the highest authorities in ISABU and its technical cooperation partners to ensure that this transfer of knowledge through training is included in the senior researchers' official job description, and also reflected in the criteria for their performance evaluation. The length of an expatriate's contract should be tied to the period required to train a national counterpart, according to a well-defined training plan.

Informal on-the-job transmission of knowledge is not enough. It should be accompanied by some formal training sessions, supported by work notes produced by the senior staff member, containing practical hints on the organization and management of the research operations, brief summaries of underlying theory and methodology, and personal observations. Furthermore, planned at the level of the institute, real training courses in specialized disciplines might be organized, some of them perhaps in collaboration with the University of Burundi.

Strong emphasis on knowledge and information transfer within ISABU will require some changes in work habits, and will somewhat reduce the amount of research done. But it cannot fail to foster staff relations and unity of purpose, and thereby enhance program coherence and research quality.

iii. STRENGTHENING EXTERNAL EXCHANGES

Strengthening regional and international linkages is a priority for an institute with limited human resources. Several procedures are particularly advisable in this respect:

- Sending and receiving missions, and exchanging scientific personnel for somewhat longer periods, between agricultural research institutes in the CEPGL region and under IRAZ/CEPGL auspices, and also with other countries in Eastern Africa (Kenya, Tanzania, Malawi, Zimbabwe...).
- Such mutual visits would help diffuse research-derived information, techniques, and material. They would also promote coordination of research activities, and pave the way for regional programs (such as those on haricot beans and potato). A major concern is to reduce duplication of efforts between ISABU and its sister institute ISAR in Rwanda.
- Organization of thematic meetings and seminars of interest to ISABU, in Burundi and participation in conferences and seminars abroad. Sending researchers to such events is most useful if they prepare a written contribution of good quality. It is desirable that manuscripts be seen beforehand by the Scientific Commission of ISABU.

As these exchange visits and seminars cost money, both the Government of Burundi and ISABU's technical cooperation partners need to make financial provisions.

Another important matter is the regional and international exchange of scientific documentation. At the level of the CEPGL, IRAZ has a key role to play. This institute should further develop its role as a clearing house for international information, for each of the three national institutes (INERA, ISABU, ISAR) and their stations.

iv. INTERNAL BULLETIN

When a particular research operation comes to an end or passes through an important phase, all ISABU staff should know about it. On the other hand, if it is to be useful, the information provided should be really pertinent and brief.

Information of a more general kind must also circulate:

- staff arrivals, departures, transfers;
- promotions, honors, and prizes;
- modifications in rules, regulations, and procedures;
- announcement of local seminars (well ahead of time) and other special events.

The feasibility of an internal bulletin for scientific and general information, crisply edited and short, could be studied. Even if editing could be facilitated by the use of a personal computer, such an initiative costs money and takes up the time of a well-trained and energetic person. The interest shown by researchers, the degree of collaboration obtained from them and the ISABU administration, and the total cost of the undertaking, could be the sole criteria for deciding on the bulletin's continuation after a trial period.

7.2 Library/Documentation

ISABU's present library and documentation system cannot satisfy the basic needs of a research institute.

Its accommodation in an annex to the main building in Bujumbura is too small; it consists of only a single room, which is inefficiently equipped. Its badly situated reading area has only five or six places. There is no photocopier, so that the person in charge, or his recently appointed assistant, has to take documents to the main building for copying, which sorely disrupts other important work.

Books are correctly classified using the AGRIS system, and are indexed by author and topic. The management of the documentation system is manual. The lending system has shortcomings that impair control of books returned, and does not permit a good monitoring of the utilization of the documentation by clients.

The library holdings consist of about 10,000 volumes (part of which are at the stations, notably Gisozi), 110 scientific and technical journals (of which 66 are paid-for subscriptions), and a complete set of all ISABU reports, proceedings and other publications, including all the published work of ISABU researchers.

Except for the salaries of personnel, the library is run entirely with funds of the Belgian Technical Cooperation. Budget restrictions have led, in 1987, to a reduction in the number of paid subscriptions from 80 to 66, by eliminating the least-consulted periodicals. The ordering of new books by ISABU staff, expatriates and nationals, entirely bypasses the librarian. The chief of each research group or program sends a list of desired books directly to the coordinateur of the Belgian cooperation program, who transmits this list to the AGCD in Brussels, via the Head of the Cooperation Section at the Belgian Embassy in Bujumbura. The librarian receives his first information when he obtains a copy of the order as transmitted to the AGCD. Books received are cleared by the CTB accountant and are systematically handed over to the library and catalogued, then sent on to the services which ordered them.

The library stock is old and many books are obsolete. Renewal is so incomplete that the library cannot bring researchers up to date in many areas. Many of them, unaware of recent literature, order books that are already surpassed. The collection of journals in the library covers a considerable spectrum of scientific and technical interests. However, some areas, notably the socioeconomics of development, are poorly represented.

The person in charge of the library has been in this position for nine years; he has only a secondary school diploma ("humanités générales"), and despite his long-standing request has never had any specialized training, with the sole exception of a few very short courses in library organization at the "Centre de Perfectionnement et de Formation en Cours d'Emploi" in Bujumbura. Recently, he has been given an assistant who, however, does not have any qualifications, so that he cannot fulfill the specialized tasks of this service.

In addition to his work as librarian, the person in charge has taken several useful initiatives. He sends out summaries of books and journals received; his distribution list includes most researchers down to program chiefs, as well as many individual researchers. He also sends journals or individual articles to certain researchers, on the basis of his own judgement regarding their special interests. But he is neither trained nor does he have the funds and equipment to perform such important tasks efficiently and systematically.

The main users of the library are ISABU researchers and students of the Faculty of Agriculture. The intensity of library utilization is not monitored, but is widely considered to be low. Many researchers do not seem to read.

Exchanges with other libraries (FACAGRO, IRAZ) are insignificant, and these libraries do not know each other's holdings, much to the inconvenience of users. On the other hand, ISABU researchers have easy access to the documentation unit of IRAZ in Gitega, but few of them have ever used it.

Recommendations

i. TRAINING OF LIBRARY PERSONNEL

Intensive professional training of a librarian/documentalist is indispensable for a better functioning of the library/documentation service. The good intentions and very deserving work of the person in charge are not in question, but rather the regrettable fact of not having sent him on professional training. It is not necessary that this training be a formal academic course of several years, but rather a practical training of three to six months of hands-on work in libraries of agricultural research institutions in Europe.

Meanwhile, an expert foreign mission to reorganize this service, provide some initial training to the library personnel, and perhaps assure a monitoring role through annual visits, seems an effective course of action for the immediate future.

ii. INFRASTRUCTURE AND EQUIPMENT

For the medium term, and depending on the planned future role of the documentation service in ISABU's overall system of information exchange within the Institute and with the outside world, ISABU should envisage to modernize the library.

This would include:

- larger accommodation, including one or two offices, and a larger and quieter reading area;
- a photocopying machine, for the use of library staff, ISABU researchers, and visitors (with proper regulations for cost accounting and cost recovery);
- more functional furniture, including bookshelves;
- when needs warrant and the personnel situation permits, a micro-computer for the lending administration and the updating of acquisitions.

iii. MANAGEMENT AND EXPLOITATION OF THE LIBRARY HOLDINGS

Bringing the library collection up to date is a necessity, as is an inventory of the documents kept by researchers and in the stations. Obsolete and outdated books should be stored in a separate place as (retrievable) archives, so as to make space for new acquisitions.

It is desirable that all requests for book purchases be seen by the librarian before orders are placed. The acquisition procedure, which often takes more than a year, should be shortened along with the processing of other material ordered in Belgium (see section 8.5).

The list of journal subscriptions should be reviewed, notably to include a few periodicals dealing with socioeconomic aspects of development. For small collections in general, it is the journals which must provide the basis of information for researchers, and therefore they must be assured of stable long-term funding. The participation in networks of agricultural data bases (e.g., AGRIS, AGRICOLA) would enable ISABU to exchange information at minimal cost and to benefit from efficient services.

To keep better control of lending and book returns, and to permit the introduction of a procedure to monitor library utilization, each book should have a lending card, kept in a box "books on loan" and immediately put back when the book is returned.

Access to documentation of staff in the stations is a special problem that needs to be further looked into.

iv. STIMULATING RESEARCHERS' INTEREST

Before investing in an up-to-date library and an efficient documentation system, it is essential that there be strong evidence of researcher interest in such a service. Contrary to what many ISABU researchers feel, the problem of scientific communication does not lie solely in lack of documentation or funds, but also, and perhaps more importantly, in researchers' lack of interest and resourcefulness to actually find and consult up-to-date information. Availability of researchers for this type of activity can only come from the recognition that a good bibliographic knowledge, built on the basis of recent textbooks and up-to-date information from specialized journals, enables one to make substantial gains in time and effectiveness.

7.3 Publications and Public Relations of ISABU

ISABU has a substantial list of publications of many kinds. The initiative and energy of departments, programs, services, and individual researchers to publish is laudable. However, it seems that too little consideration is given to the advantages of some degree of harmonization of publications from different units, and of laying down some guidelines for editing, production, and distribution.

As noted in section 7.1, some ISABU publications are very good, but others -- reports, articles, technical notes, and miscellaneous productions -- are deficient in content and form, so that their usefulness is impaired.

Heavy technical notes, scientific papers encumbered with descriptions of protocols, and forbidding research reports affect the readers' interest. They also cost far more to produce and distribute than crisp, attractively organized, client-oriented productions.

Despite its many publications, ISABU has done little in the past to promote public understanding of its roles and achievements. Attractive written and audiovisual material to highlight its improved technologies hardly exists. But there is an awareness of the need for such material. The first videofilms of the Pre-extension Service, even if imperfect, have attracted much attention, not only as a training tool for extension personnel, but also for a more general public. In fact, one of these has been shown on television.

Recommendations

To improve the usefulness of its publications, ISABU needs a consistent publications policy, as well as corresponding guidelines for editing, refereeing, layout, and actual production, for the various types of documents it produces or might wish to produce. These could be:

- a. Formal ISABU productions destined for wide distribution
 - The Annual Report
 - Research reports
 - Technical Notes
 - "Fiches Techniques" (Pre-Extension Service)
 - Plates and posters (Pre-Extension Service)
- b. Scientific publications of ISABU staff in outside journals
- c. Unpublished material and miscellaneous publications
 - Program Data Sheets and Operation Data Sheets ("Fiches-programme/Fiches-opération")
 - Conference and seminar papers
 - Internal information bulletin (see section 7.1(iv))
 - Reports of missions and visits.

The recruitment of a scientific journalist, who could be provided by a technical cooperation agency pending the training of a national, would be an important asset in this connection.

ISABU must also increase its efforts to inform donor representatives, politicians, ministries, and the public at large about positive and promising research results. To increase its capacity to produce videofilms and other suitable material for this purpose, as well as for the training of extension agents, it needs to assign more staff and more funds to the Pre-Extension Service, including a film-maker.

8. FINANCE AND PHYSICAL RESOURCES MANAGEMENT

8.1 Government Subsidy and External Funding for ISABU

Measured as a percentage of agricultural gross domestic product (AGDP), the contribution of the Government of Burundi to funding national agricultural research is among the lowest in Africa. In 1987, only 0.14% of AGDP (110 million FBu out of an AGDP of 77.5 billion FBu), were invested in ISABU. If ISABU's own receipts (37 million FBu) and Japanese food aid funds for rice research (15 million FBu) are included, the figure becomes 162 million FBu or 0.21% of AGDP.

On the other hand, foreign assistance amounted to 428 million FBu, excluding the personnel charges of the expatriate staff. The real cost of these staff is about 400 million FBu, but a more representative estimate is obtained by using corresponding local emoluments. These are estimated at 1.45 million FBu per annum per person at "chef de division" level, inclusive of housing and social security premium. Thus, the total value in local terms of the expatriate researchers is estimated at 50 million FBu.

The total external contribution to ISABU therefore comes to approximately 478 million FBu, and the total investment in ISABU including national funds amounts to 640 million FBu (US\$ 4.3 million), which corresponds to 0.8% of AGDP.

This is a reasonable percentage in comparison with certain other African countries, especially since, thanks to foreign assistance, it contains a relatively favorable provision for operating expenses. But given the crucial importance of the agricultural sector to the stability of the Burundian economy, and the enormous diversity of the country's conditions, it is still a modest investment.

The real problem (apart from that of better defining problems and choosing priorities, discussed in earlier chapters) is the very low part of the Government subsidy in the total agricultural research investment.

An analysis of the public budget shows that this is linked to the very low percentage of the total recurrent budget which is allocated to the Ministry of Agriculture and Livestock: 665 million out of 25,240 million FBu, or 2.63% in 1988. Of this allocation, ISABU receives 16.5%. But MINAGRI also receives 28% of Burundi's total investment budget: 1,120 million FBu out of 3,984 million FBu, most of which is spent on counterpart contributions to foreign-assisted development projects (for the greater part, operating expenses including salaries). ISABU receives none of this. When the recurrent and investment budgets are added together, it appears that MINAGRI's share of the total Government budget is a modest 8.5%. But of this total MINAGRI budget (recurrent and investment funds together) ISABU received in 1988 a share of only 6.16%.

It must be concluded that MINAGRI's share in the Government budget is very modest, and that ISABU's share in MINAGRI's total budget is too low,

given the importance of research to the nation's future, and the fact that many development projects are currently hampered by lack of relevant technology.

Under such conditions it is not surprising that ISABU relies on donors for 75% of its recurrent budget needs, including salaries (valuing expatriate staff at local emolument levels). Most of its own budget is used for paying the salaries of national staff. In 1987/88, only two programs were financed from that local budget. The operating costs of all other programs are totally funded by donors. They even pay the personnel charges of over 20% of all national researchers and technicians. Although ISABU is formally obliged to maintain station infrastructure from its own budget, the stations suffer from a chronic lack of finance and materials for repair and upkeep. Certain stations have seasonal water supply problems, unattended to for lack of money. The ACCD of Belgium has contributed to infrastructure maintenance in recent years, and other donors are being asked to do the same. Overall, the situation is precarious, and poses enormous risks to the stability of agricultural research in Burundi.

Recommendations

The first conclusion, therefore, is that the Government's own contribution to ISABU should, without delay, at least be double of what it is today (i.e. 220 million Fbu in 1987 terms) merely to reach a more creditable level of funding in relation to donor investments.

Such an increase, which would bring the Government subvention to just under 30% of total funding (with expatriates valued at local emoluments), would enable Burundi to pay for all national researchers and technicians, to maintain its infrastructure, and perhaps to make a token contribution to the operating expenses of some programs. This necessary minimum step would greatly enhance ISABU's voice in program negotiations with its partners.

8.2 Cost Assessment of Infrastructure Maintenance

The upkeep of ISABU's infrastructure is being neglected, at all stations. This carries an extremely high future cost. No reliable estimates exist of the value of these infrastructures, nor of the cost of their satisfactory maintenance.

Recommendations

A complete inventory and objective evaluation of all infrastructure at all stations is urgently required. The cost of maintenance -- and of minimal modifications where necessary -- should be established for all items that are still functional. This evaluation should determine the size of a minimum maintenance budget.

8.3 Station Equipment Needs

As stated earlier, certain basic equipment and materials are lacking, and means of transport are inadequate in some stations. Water supply is unreliable in Gisozi due to a broken pump, impairing laboratory work and domestic convenience.

Recommendations

Each station needs a few items of equipment without which it cannot function efficiently. At a minimum, this should include one good vehicle for general (non-program-related) station transport, under the responsibility of the station director, subject to well-defined and realistic rules, with funds for fuel and maintenance as justified. Similarly, the centres (most of which are isolated) should have sufficient motorbikes to avoid lengthy work interruptions when there is a breakdown.

The second essential item is a photocopying machine at each station, with money for paper and toner. Research and station administration are handicapped when one has to wait for a trip to Bujumbura to copy a few pages.

The corollary of providing such facilities must be extreme firmness on the part of station management in ensuring good maintenance and avoiding improper or unauthorized use. The ISABU directorate must provide backing for such firmness, but also exercise control.

8.4 Greater Autonomy in Station Management

The stations dispose of a revolving cash fund, of which the monthly ceiling is 50,000 FBu. The payment of these funds is centralized to avoid suffocating those stations that have no revenues of their own. However, while the revenues realized by the stations (totalling 10 to 20 million FBu) are recycled throughout ISABU, they do not necessarily end up in the stations that need this money most.

Recommendations

A general improvement of work and living conditions in the stations is impossible without station directors having a certain management latitude. A greater degree of autonomy could be accorded to the stations, notably by progressively reducing the centralization at the level of ISABU headquarters; but this depends on the total budget allocated by the Government and the frequency and regularity with which instalments are received.

It is worth experimenting with providing station directors a cash advance for specified categories of items, to be replenished on the basis of ex post accounting. To do this, one would need a combination of more flexible accounting regulations, satisfactory instruction in procedures and definition of responsibilities, proper control mechanisms, and rigorously administered sanctions in the event of a breach of trust. ISABU's regulations contain ample provisions for sanctions. The Committee of Directors, with backing from the Board of Governors, will have to see to it that these are applied when the need arises.

8.5 Reducing Delays in Processing Purchase Orders in Belgium

Belgian rules require that one-third of aid funds destined for purchases of equipment and materials be spent in Belgium. Nationals and expatriates alike are dissatisfied with the long delays in the processing and delivery (commonly eighteen months) of goods ordered through AGCD in Brussels. Possibilities to reduce these delays are limited, given constraining public administrative and accounting procedures in Belgium. The fact that Belgian Technical Cooperation loses effectiveness by centralizing too many things in Brussels, is recognized at the highest political level (see, for instance, the interview with the Belgian Minister for Development Cooperation in *La Libre Belgique*, 106 No. 176, Friday 24 June 1988). This may augur well for a decentralization of certain AGCD functions to outposted staff.

Recommendations

While hoping for such structural improvements, ISABU might begin trying to reduce delivery time by (a) requiring all researchers to submit their well-documented purchase orders to the CTB accountant at ISABU at the beginning of the new fiscal year (September) instead of the following January/February, and (b) asking the CTB accountant to compile these purchase orders immediately, so that the AGCD in Brussels can process them as soon as the Council of Ministers has approved the Budget -- usually several months into the financial year.

8.6 Use of Vehicles

Given the overriding importance of technical cooperation in the functioning of ISABU, the issue of vehicle use merits particular attention, as it risks affecting the good understanding between national ISABU staff and their expatriate colleagues. Nationals in certain externally funded programs feel disfavored by comparison with their counterparts. Most people on both sides agree that this sentiment, while sometimes biased, is justified to some extent.

Recommendations

There is no ideal solution to this problem, which is quite common in countries relying on technical assistance. The fact that there cannot possibly be as many vehicles as there are researchers in all the externally assisted programs implies the need for reasonably equitable rules. These should be based if possible on a consensus between the ISABU directorate and the coordinators of the technical assistance programs in ISABU. Assigning the vehicles to the various research programs under the control of the respective program chiefs in respect of their allocation and utilization, and not to individuals, seems the most desirable solution. However, it is essential that every program chief and vehicle user respects the rules of good cooperation, without trying to get personal advantages out of it.

All possible solutions must be checked jointly for their direct and indirect consequences. It happens in cases like this that decisions taken create more serious and widespread complications than the specific problem they were meant to solve.

8.7 The Procurement and Accounting System

Many people in ISABU have stressed the problems caused by the disparities in the mode of financial management and accounting within the institute.

ISABU has an accountant who manages the funds of the regular budget and all or part of the funds provided by certain cooperation agencies. There is a completely separate accounting system for all funds from Belgium, and another one for the French contribution (FAC). A large part of the USAID funds are managed independently as well. Donor agencies will not usually adjust their specific budgeting, acquisition, accounting and control requirements to the circumstances of each individual country they assist: these requirements depend on the donor country's national legislation, and donor practices often are under close scrutiny. Some donors insist on their own expenditure control over all their funds, others are able to delegate it to ISABU, with more or less regular reporting requirements.

ISABU aims for what it calls joint management ("co-gestion"). This is not so much a question of who keeps the books, but rather one of having a say in the actual expenditure. There is also a desire for complete expenditure information, to permit the assessment of the total cost of each program, which in turn is important in planning and priority setting.

Expenditure in the French-funded CRAF project for forestry, agroforestry and soil conservation is very flexible, since there are only a few budget lines. The person formally authorizing expenditure is the Chief of the French technical cooperation in Bujumbura, to whom the project leader proposes and justifies the purchases. For the remainder, the project leader has authority over his purchases, but he regularly provides all expenditure information to the ISABU accountant. The USAID-funded SFSR is administered autonomously, and expenditure information to ISABU is only partial. Some other projects are administered by ISABU itself.

In the case of Belgian assistance, these conditions of joint management are not yet fulfilled, but will soon be met in a special agreement between the AGCD and ISABU. These arrangements will define a framework for the day-to-day management of the scientific personnel, the research infrastructure, and the equipment.

It appears that there are mainly communication problems, which have little to do with joint management per se. Many complaints by national researchers in particular stem from lack of understanding of procedures and constraints.

Here are some examples of facts that are not well understood:

- It is not useful to complain about a donor's legal requirement that a certain proportion of its grants must be spent in its own country, as any changes in such rules require complex political decisions. Even so, such changes would be welcome.
- It is misleading to state that "national researchers have no grip on the budget; everything passes via the expatriate". All details of

the following year's purchases are laid down in the budget prepared for the Commission Mixte. Researchers should have been fully involved, if they and their own program chief have done their job. Not unreasonably, the program chief is the person who normally requests purchases, and these must be in conformity with the agreed budget provisions. Researchers must therefore express their needs through the program chief, irrespective of whether he is a national or an expatriate. However, the program chief can delegate his authority to place orders to other members of his research team, and this is happening in certain cases, particularly where researchers in outlying stations are concerned. This then must be communicated to the accountant, and applies to items and quantities to be specified.

- It is for a program chief to keep all his researchers informed of the purchase orders made, funds committed and spent. The breakdown of requirements by researcher is known to the program chief, but it is not part of the present accounting system. Failure of program chiefs (of any nationality) to inform their researchers is a matter for the ISABU Director General, not the accountant.

Recommendations

Misunderstandings among staff can take unpleasant overtones. The ISABU Director General and the heads of the respective programs of technical cooperation have a formal duty to frankly discuss and clarify such issues. Once this has been done, it only takes a carefully written circular to correctly inform all personnel.

The planned computerization of the Belgian accounting system, in the form of a "comptabilité analytique" by research program, can provide an opportunity to bring about an integration between ISABU and the CTB accounts. Perhaps it could involve the other externally funded projects, too. The result would be:

- better harmonization of all expenditure records, as desired by ISABU;
- instant availability of expenditure and balance statements, per program;
- economy in manpower use;
- sharp reduction in the risk of errors;
- a unique opportunity for in-service training of ISABU personnel.

There could be no better opportunity for ISABU to modernize its operations, improve its efficiency, systematically develop program-based budgeting and accounting as a research planning tool, and achieve joint management and good expenditure transparency.

Accounting is among the most sensitive and conspicuous of all areas of management. Many developing-country institutes have spent large sums of money and much time to acquire the necessary skills and rigor. ISABU would probably be able to develop these smoothly and at little cost. Obviously, it would require the ISABU accounts to be computerized at the same time as the CTB accounts, but this should not present undue difficulties, as the knowledge and experience needed could undoubtedly be shared. ISABU and the CTB would have to work out a joint formula for the day-to-day operation of an integrated system which satisfies the requirements of both parties. A prime requirement for ISABU would be to ensure that its accounting personnel have the necessary advanced knowledge and skills.

9. OBSERVATIONS ON SOME PROGRAMS AND SERVICES

The aim of this mission was not to examine in detail any particular ISABU programs. However, some observations are made on a few special programs and services, because of (a) their role in the planned reorientation of agricultural research, and/or (b) the opportunities they present for building closer working relationships with MINAGRI and projects.

9.1 Phytosanitary Control

In response to a high priority for national agricultural development, MINAGRI is creating a National Plant Protection Service (SNPV) under the Department of Agriculture. At the same time, ISABU intends to set up a phytosanitary research-inventory unit ("Cellule Recherche-Inventaire). There is an explicit understanding that this unit will be integrated into the SNPV after five years. These two initiatives can reinforce each other if the linkages between ISABU and MINAGRI are adequately developed in this regard.

THE PHYTOSANITARY RESEARCH-INVENTORY UNIT

This unit will consist of fifteen technicians, one per province, plus two "ingénieurs agronomes" with a plant protection specialization. The technicians, specially trained during one year and then supervised on the job, will regularly monitor disease attacks on all crops farmers grow, using a detailed schedule of field observations. They will communicate their observations to the SNPV officers in their respective regions, and to the researchers of the plant protection program of ISABU. They will also verify the field applicability and test the efficiency of new disease control strategies developed by research. Finally, they will participate in the training of local extension agents (as is already being done in Kirundo).

The two "ingénieurs agronomes", one of whom will be a national, will be based at ISABU headquarters. They will have the task to establish this program, train the technicians, and coordinating the unit's activities with the work of the SNPV.

ISABU's initiative is designed to (a) produce a great deal of information of the dynamics of pathogens which the researchers need to develop their crop protection strategies, and (b) participate in the process of creating an efficient national crop protection service.

Although MINAGRI has some misgivings about ISABU setting up this unit, rather than having it incorporated into the SNPV from the outset, the chosen approach has many advantages. In fact, only ISABU's comparatively strong Plant Protection Division can more or less confidently assure the training of as many as fifteen technicians to the required high level of knowledge and skill in disease diagnosis and treatment. Technicians of similar abilities already exist in the Division.

The SNPV

This Service is under the authority of MINAGRI. It is scheduled to be reorganized and strengthened with World Bank assistance.

Its task is to improve the protection of crops and stored produce from diseases. It will do so by improving the management of control methods, and monitoring and evaluating pest control campaigns, in which it will work in close liaison with projects on the one hand, and with the research-inventory unit on the other.

The SNPV's diverse activities will be undertaken by five teams, one for each large ecological zone into which the country has been divided for this purpose. These teams will be based in Bujumbura, Makamba, Gitega, Ngozi, and Cankuzo. Each team will consist of three phytosanitary inspectors led by a Regional Plant Protection Ingénieur at A1 level.

An excellent coordination of activities and active information exchange between the SNPV, ISABU's crop protection research program, and the research-inventory unit are of fundamental importance for achieving an optimal crop protection coverage of the country, and for the development of control methods that are not limited to the application of pesticides.

Recommendations

- ISABU should seriously try to answer several questions underlying MINAGRI's hesitations concerning the research-inventory unit's capabilities, approach and projected activities. For example: Can a technician competently cover the many diseases one finds in farmers' fields? How will one determine which diseases have the greatest effect on yield, and so should have priority consideration? How will the work of this unit influence, for any given crop and disease, the choice between the use of pesticides and selection for resistance?
- It is recommended that a consultative committee between MINAGRI and ISABU, chaired, for instance, by the Director General of Agricultural Planning, be created to guide the work of this unit, and to monitor progress towards the objective of handing it over to MINAGRI after five years.
- The needed interactions between the SNPV, ISABU's crop protection research program, and the research-inventory unit would be greatly stimulated by housing the research-inventory inspectors in the same premises as the SNPV staff wherever this is possible.

9.2 Seed Quality Control

MINAGRI is planning to establish a National Seed Service, with assistance from USAID/Mississippi State University and Belgium. This Service will multiply the best varieties of certain crops, using seed cooperatives and seed farms. It cannot operate without (a) crop varieties with so much improved performance that the farmer really wants them, and (b) high-quality prebasic seed of these varieties. ISABU has been criticized for being deficient on both scores.

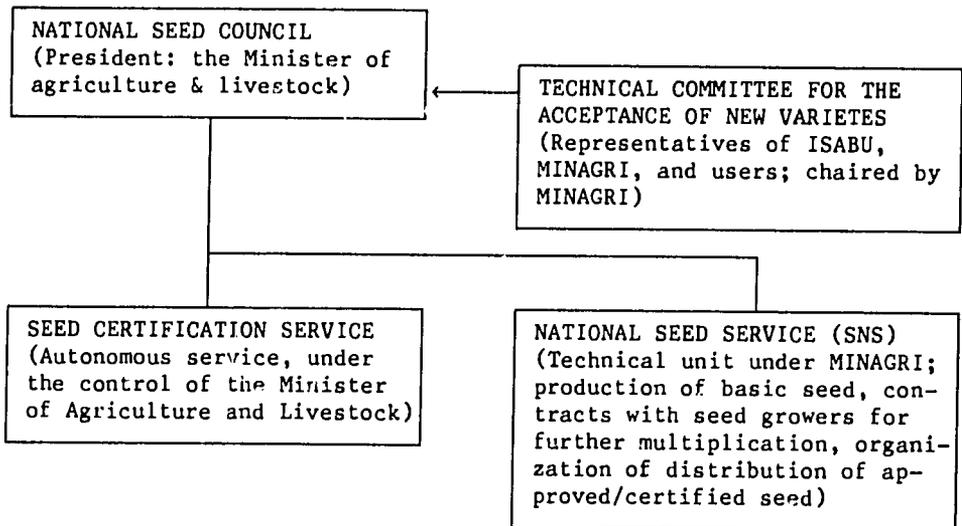
To improve the quality of the prebasic seed it produces and diffuses, ISABU on its part has created, with FAO assistance, a Service for Seed Control and Certification. This Service carries out laboratory seed quality tests only.

MINAGRI, which is studying the feasibility of setting up a national seed certification scheme, rightly objects to ISABU's idea (implied in the name of its seed unit) of having a separate certification scheme for its own seed. A certifying authority must be completely independent vis-à-vis the seed producers on the one hand, and government departments on the other.

On the other hand, ISABU must have a strict control mechanism of its own in order to guarantee the diffusion of high-quality prebasic seed only. To formally certify this seed may not be necessary. But if it is done, it should be undertaken by the national seed certification unit to be set up by the Government.

Recommendations

- In view of the above, the reference to "certification" in the name of ISABU's seed control service should be dropped.
- The following governing structure is recommended, to integrate concerns for both high-quality seed and high-performance varieties:



9.3 The Pre-extension Service

The task of ISABU's Pre-extension Service is to contribute to a more efficient technology transfer process. This Service is bound to grow and develop in the context of ISABU's new research orientation, and as a necessary complement to the establishment of research workshops.

This Service is composed of two researchers (one national and one expatriate) and one graphic artist. The principal activities are the production of "fiches techniques" (5 to 10 per year) and videofilms (also 5 to 10 per year) intended for the extension service to facilitate the understanding of technical themes developed by the researchers of ISABU. Training of extension officers is a second thrust of this Service. Finally, it provides researchers with feedback from the field on the suitability of, and problems encountered with, the technologies they are proposing.

Thus, the Pre-extension Service acts as a two-way transmitter between researchers and extension agents.

Its principal clients are the extension supervisors of the SRDs and projects as well as MINAGRI. The audiovisuals and training intended for them serve not only to enhance their own understanding and mastery of new technologies, but also to facilitate their task of transmitting this understanding and these skills to the field extension agents who must diffuse them to farmers.

Clearly, the Pre-extension Service cannot deal directly with all field extension agents: there are too many of them. A fortiori, it has neither the role nor the capacity to engage in extension work or farmer training, nor will it generally produce material for direct distribution to farmers.

The extension officers also need to become familiar with the diversity of technical messages which might be appropriate for farmers in different socioeconomic conditions. Until now, extension has limited itself to the diffusion of fairly standardized recipes (if these were available) without taking such differentiation between farmers into account. In the future, the field extensionist (and a fortiori the person who has trained him) should be made to enquire into the farmers' specific needs and wishes.

The second main line of activities of the Pre-extension Service is to maintain a dialogue with the researchers. To fulfill this role, its staff must keep abreast of progress in all programs. This has been tried in vain through a questionnaire; given the low rate of response, it appears that there is no substitute for personal discussions with the researchers concerned. It is very important for researchers to obtain reliable feedback before they finalize their technology. To hear about adoption problems, and perhaps receive alternative suggestions, at a sufficiently early stage enables the researcher to be broader in his thinking about the types of technology that might stand the best possible chance of being adopted by farmers.

A subsidiary activity of the Pre-extension Service is the production of audiovisuals to support ISABU's efforts to inform the general public, politicians, planners, and donors of its work, objectives, and achievements.

Recommendations

- Given the diverse tasks of the Pre-extension Service, it requires a larger and very highly qualified staff, including a professional film-maker;
- The Pre-extension Service should consider the research workshops as "observatories" to assess the proposed technologies in the real world; but it is not their business to intervene, except as the head of a workshop may request.
- Strong functional linkages are needed with the extension services of MINAGRI, as well as with SRDs and projects; MINAGRI might promote these links by posting a senior extension officer as research-extension liaison officer to the Pre-extension Service.

9.4 The Small Farming Systems Research Project (SFSR)

The SFSR project has started its field work in 1987. It is therefore too early to accurately assess the effectiveness of the research methods used and of the research-development activities under way.

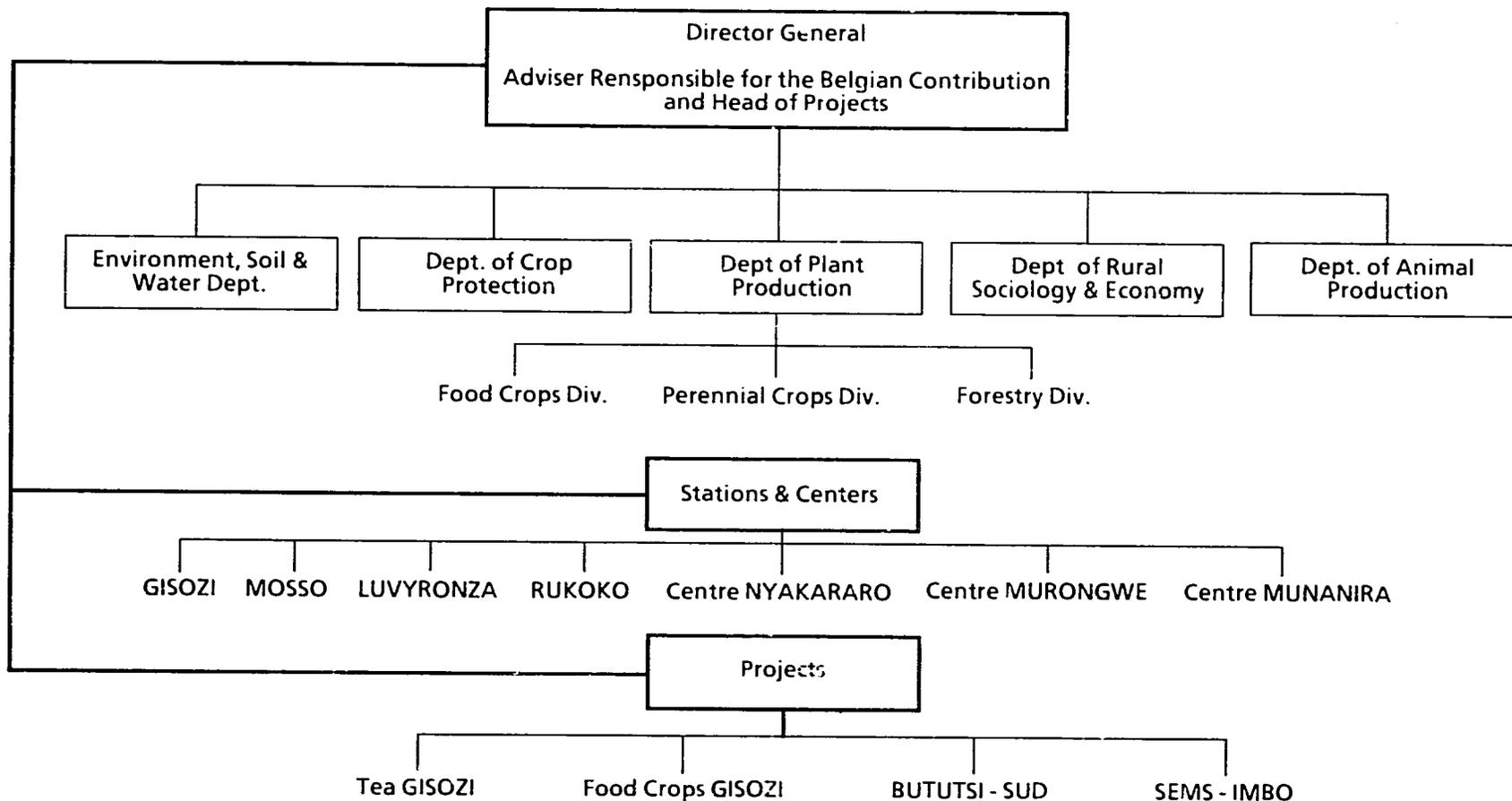
The SFSR has not been sufficiently integrated into the mainstream of ISABU's work. This will become much easier in the new context of the planned regional research workshops. On the strength of its experience in the commune of Bugenyuzi, the SFSR will have a specific role to play in proposing methods for, and taking part in, the diagnostic surveys for each of these workshops.

Recommendations

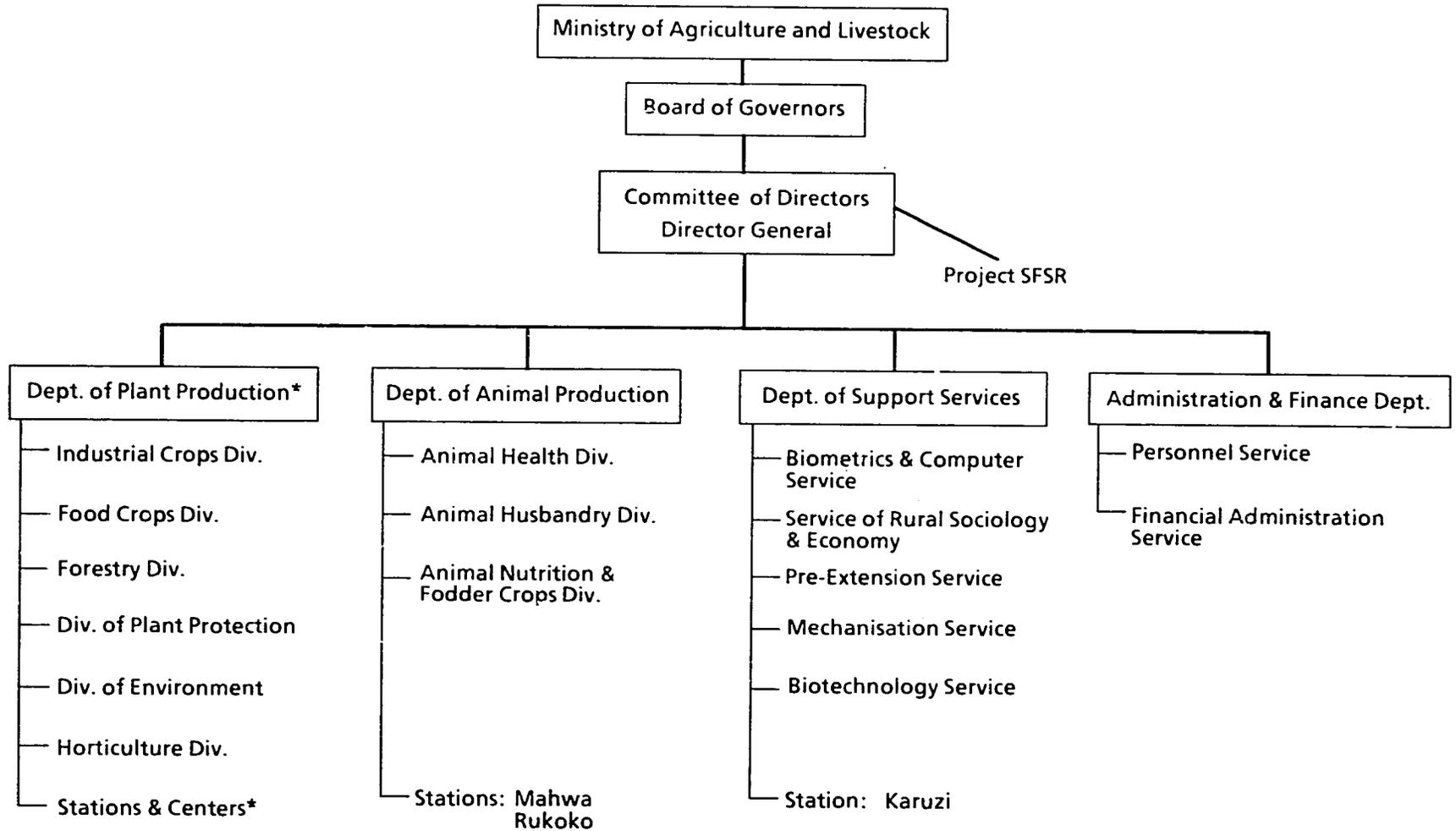
For the remainder, it is recommended that the project as a whole (perhaps under another name that harmonizes better with the ISABU structures) be regarded as a research workshop in its own right, with its own geographic area of operation and its own priorities based on local needs as already identified.

Contrary to what is, or seems to be, foreseen for the other workshops, the SFSR is focused on one particular commune and not a whole region. It would be judicious to maintain this distinction because it permits a comparison of two different approaches with regard to size of area covered. If this is not possible, an alternative would be to expand the area of activity of the SFSR to a whole region. But it would be a waste of all previous efforts if the follow-up studies conducted in the present project area were abandoned. Furthermore, without this, it would also be impossible to evaluate the suitability of the SFSR approach in the light of ISABU's objectives and Burundi's needs. Such an evaluation is an obvious prerequisite to extending this approach to other areas.

Organization Chart of ISABU, 1977

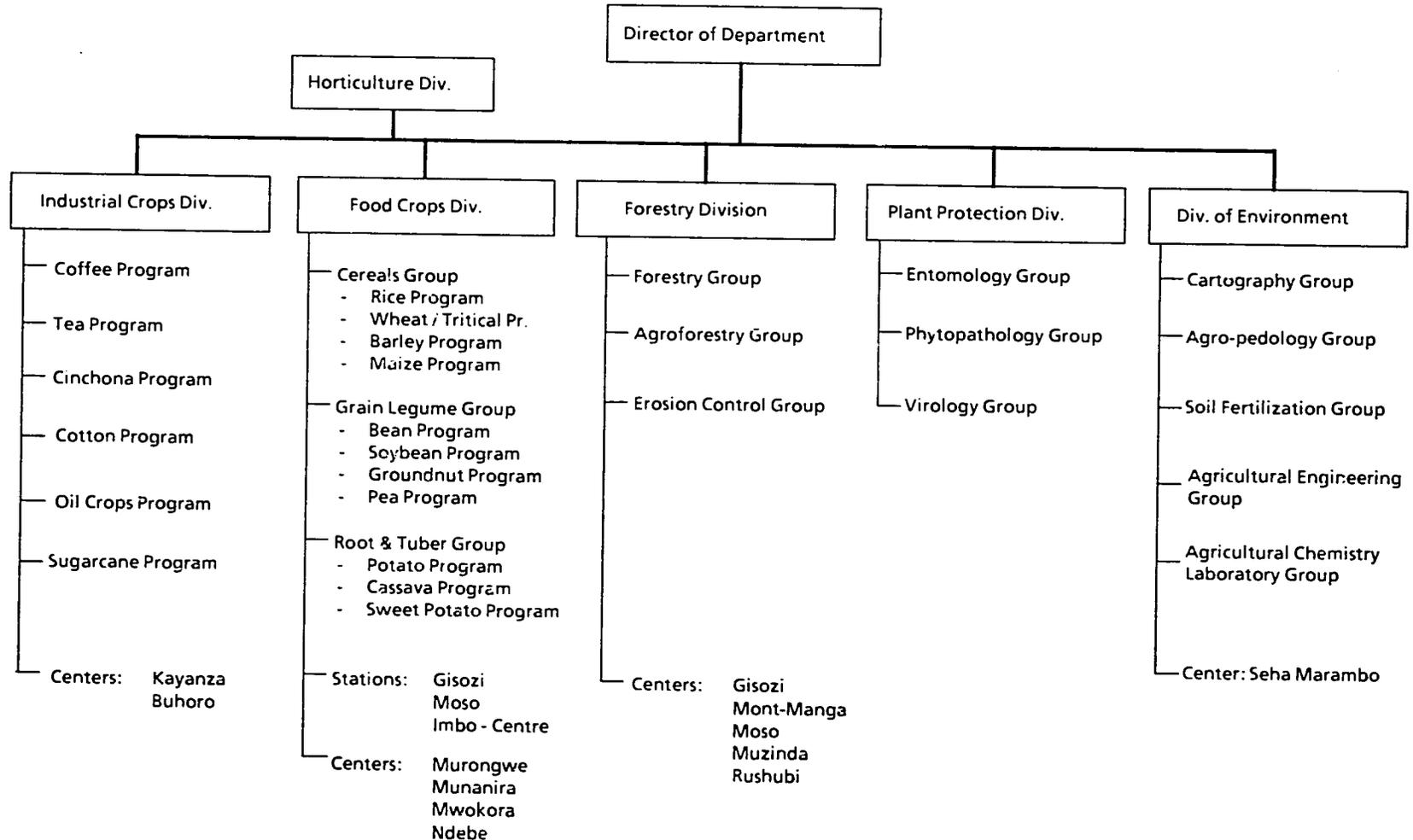


Organization Chart of ISABU (since 1985)



* See Annex 3

Organization Chart of the Department of Plant Production



ACRONYMS AND ABBREVIATIONS

AFRENA	- Agroforestry Research Network for Africa
AGCD	- Administration Générale de la Coopération au Développement / General Administration for Development Cooperation, Belgium
CEPGL	- Communauté Economique des Pays des Grands Lacs / Economic Community of the Countries of the Great Lakes
CIAT	- Centro Internacional de Agricultura Tropical / International Center for Tropical Agriculture, Cali, Colombia
CIMMYT	- Centro Internacional de Mejoramiento de Maiz y Trigo / International Maize and Wheat Improvement Center, Mexico
CIP	- Centro Internacional de la Papa / International Potato Center, Lima, Peru
CRAF	- Cellule de Recherche en Agro-foresterie / Agroforestry Research Unit
CTB	- Coopération Technique Belge / Belgian Technical Cooperation
EEC	- European Economic Community
EMSP	- Etudes du Milieu et des Systèmes de Production / Environment and Production Systems Research
FACAGRO	- Faculty of Agriculture, University of Burundi
FAO	- Food and Agriculture Organization of the United Nations
FBu	- Burundi Franc
IARC	- International agricultural research center
IDRC	- International Development Research Centre, Canada
IITA	- International Institute of Tropical Agriculture, Ibadan, Nigeria
INERA	- Institut National pour l'Etude et la Recherche Agronomique / National Institute for Agricultural Study and Research, Zaire
Ing. Agro.	- Ingénieur Agronome
Ing. Tech.	- Ingénieur Technicien
Ing. Zoot.	- Ingénieur Zootechnicien
IRAZ	- Institut de Recherche Agronomique et Zootechnique / Agricultural and Animal Production Research Institute of the CEPGL, Gitega
ISABU	- Institut des Sciences Agronomiques du Burundi / Burundi Institute of Agricultural Sciences
ISAR	- Institut des Sciences Agronomiques du Rwanda / Rwandan Institute of Agricultural Sciences
ISNAR	- International Service for National Agricultural Research, The Hague, Netherlands
Méd. Vét.	- Médecin Vétérinaire
MINAGRI	- Ministère de l'Agriculture et de l'Elevage / Ministry of Agriculture and Livestock
PIB	- Produit Intérieur Brut / Gross Domestic Product
PIBA	- Produit Intérieur Brut Agricole / Agricultural Gross Domestic Product
SFSR	- Small Farming Systems Research Project
SNPV	- Service National de Protection des Végétaux / National Plant Protection Service
SRD	- Société Régionale de Développement / Regional Development Company
USAID	- United States Agency for International Development