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Report of an

ISNAR / IITA Mission

to the

Institut de Recherche Agronomique et Zootechnique

of the

Communauté Economique des Pays des Grands Lacs

(Burundi, Rwanda, Zaïre)

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R.B. Contant, ISNAR
R.F.E. Devred, ISNAR
T.L. Lawson, IITA

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isnar

P.O.Box 93375
2509AJ, The Hague
Netherlands

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ISNAR-IITA Mission Report to the
'Institut de Recherche Agronomique et Zootechnique'
of the 'Communauté Economique des Pays des Grands Lacs'

July, 1981

I. Summary

At the request of the Director General of the 'Institut de Recherche Agronomique et Zootechnique' (IRAZ), an exploratory mission of the International Service for National Agricultural Research (ISNAR) and the International Institute for Tropical Agriculture (IITA) visited the three countries of the 'Communauté Economique des Pays des Grands Lacs' (CEPGL), Burundi, Rwanda and Zaïre (Kivu) from May 27 to June 9, 1981.

The mission examined the mandate and proposed scope of the activities of IRAZ. This report, which should be considered together with the findings of a forthcoming mission of national consultants, indicates some of the areas in which decisions are needed at national and regional level before a precise role for IRAZ can be determined. It presents, nevertheless, some elements which could form the basis of short- and medium-term programs once the outstanding issues have been resolved. The two main issues yet to be decided are (i) the precise nature of the role of IRAZ and (ii) the geographical limitations to be placed on its activities.

Although the General Assembly, the ruling body of IRAZ, has proposed that the role of IRAZ should be essentially in promoting and coordinating activities between national institutes and in the provision of support services for them (a proposal which the mission supports), it appeared that this proposal was not yet fully accepted by all parties in the participating countries. There also appears to be a lack of agreement as to the precise geographical area to be covered. From agro-ecological and logistical considerations, it would appear that IRAZ should function within Burundi, Rwanda and the mountainous parts of Kivu province of Zaïre (a relatively homogeneous agricultural region) and should not attempt to take in the whole of Zaïre. Although this proposition is recommended by the mission, it is recognized that this is an issue which can be decided only by the Governments of the countries concerned.

Recommendations are made for IRAZ activities in two specific fields; general support services and coordinated research programs. Ten specific suggestions are made for general services to be provided by IRAZ: inventories and reference systems of institutions, projects, manpower, documentation and genetic resources; circulars; links with faculties of agriculture; exchange with other countries; phytosanitary control procedures; meetings; and consultancy missions.

Coordinated research programs are proposed for potato, with CIP*); sweet potato and cassava, with IITA; grain legumes, with CIAT, IITA, ICRISAT and IDRC; maize, with IITA/CIMMYT; grasses and fodder legumes, with CIAT; cropping and farming systems; with others to follow later. A general procedure is outlined for formulating and managing coordinated research programs.

A recommendation is made concerning the location of IRAZ headquarters.

II. The Mission

Introduction

By letter of January 14, 1981 the Director General of IRAZ requested the Director General of IITA to make available one specialist in crop production to join a team of national consultants from the three CEPGL member states in a four-month mission with the following terms of reference:

- to make an inventory of the agricultural resources of the Community;
- to identify the common agricultural research projects in the Community;
- to prepare a review of agricultural research in the member states.

The study was expected to take place from early March till the end of June, 1981 and to culminate in a detailed report which would include a short-, medium- and perhaps a long-term program for IRAZ.

In his reply of February 18, 1981, the Director General of IITA, after consultation with the Director General of ISNAR, expressed the view that ISNAR would be in a better position than IITA to respond to this request, because ISNAR's mandate is directly related to national research systems in planning all aspects of agricultural research, whereas the IITA mandate covers research and training on selected food crops, and on Farming Systems for the lowland humid tropics.

By letter of March 2, 1981 the Director General of ISNAR expressed his readiness to organize an exploratory visit to IRAZ by an ISNAR staff member to discuss a number of questions as well as possible cooperation. By telex of April 7, to which an affirmative reply from the Director General of IRAZ was received on April 15,

*) CIAT: International Center for Tropical Agriculture, Cali, Colombia
 CIMMYT: International Maize & Wheat Improvement Center, Mexico, D.F.
 CIP: International Potato Center, Lima, Peru
 ICRISAT: International Crops Research Institute for the Semi-arid Tropics, Hyderabad, India
 IDRC: International Development Research Centre, Ottawa, Canada

ISNAR specified that the visit would be of about two weeks' duration and expressed the hope that a brief synthesis of agricultural research in each country and an inventory of research resources and current programs in Burundi, Rwanda and Zaire would be available to the mission at the beginning of its visit. It was also requested that the program for the visit include a tour of the network of experimental stations in Burundi, Rwanda and eastern Zaire.

In April, 1981 the Directors General of ISNAR and IITA decided that a specialist from IITA would join the mission.

Three persons comprised the mission that visited IRAZ during the period of May 27 through June 9, 1981: Dr. R.F.E. Devred, ISNAR, who arrived May 25 to complete plans and to initiate discussions; Dr. R.B. Contant, ISNAR, who arrived on May 27 for the official start of the mission; and Dr. T.L. Lawson, IITA, who participated from June 3 through the rest of the visit.

Documents

The mission received a number of documents for its orientation upon arrival in Bujumbura; other documents were available for consultation at IRAZ headquarters. Some additional notes were obtained regarding several of the research stations of ISABU (Burundi) as well as a few documents of ISAR (Rwanda). All documents are listed in Annex 1.

Because of a delay in the planned mission of national consultants from the CEPGL member states, the present mission could not be supplied with the synthesis of research needed for each country. Nevertheless, it was able to obtain a reasonable overview of research in progress.

Program of the Visit

The program of the visit is detailed in Annex 2.

Terms of Reference

Because of the exploratory nature and brief duration of this visit, the mission could deal only with selected aspects from the terms of reference which the Management Committee of IRAZ had prepared for the 4-month joint mission of national and expatriate consultants. It was agreed that the mission would make preliminary proposals for a short and medium term program for IRAZ. The consultants resolved to concentrate on the definition of a meaningful and logical role for IRAZ in the context of the geographic, socio-economic and political realities of the three countries that make up the Community. To establish a clear framework for its recommendations, as well as to avoid any ambiguities or inconsistency in its report that might be the source of problems later, the mission examined the Agreement under which IRAZ was established, its Constitution and several policy documents issued by the CEPGL Executive Secretariat and the IRAZ General Assembly.

In line with this, the consultants conceived their task in the following general terms:

- *** To suggest to IRAZ a pragmatic delimitation of its task within the terms of the Iraz Constitution, taking into account the existence of three national agricultural research institutes, their structure, mode of operation and current programs, as well as the priority development objectives of the three CEPGL countries.
- *** To make specific suggestions for a short-term and, to the extent possible, a medium-term action program for Iraz.
- *** To examine the most important logistic constraints which Iraz is facing and to make suggestions for their removal.

A detailed assessment of the individual crop and animal research programs was not included in the terms of reference because of time constraints and the expectation that this assessment could best be made during the planned mission of national consultants.

Acknowledgements

The members of the mission record their deep appreciation to the members of the Management Committee of Iraz for all arrangements made, for accompanying them on their field visits in the three countries and for the extremely kind reception accorded to them.

They also extend their thanks to the Directors General of ISABU and ISAR and the Director of the Kivu Sector of INERA, and to their staffs, for all the efforts made to acquaint the mission in a short time with the most important elements of their respective research programs.

The mission expresses its appreciation to H.E. the Minister of Agriculture and Livestock of Burundi, the Secretary General of the Ministry of Agriculture of Rwanda, the Governor of Gitega and the Prefect of Butare, for giving of their valuable time and important information.

III. Recommendations

Mandate and Scope of Iraz

The role of Iraz

A Program for Iraz can only be formulated in the context of an agreed role for the Institute within the total of national and regional structures, institutions and programs dealing with or impinging on agricultural research and development in the three countries of the Community.

According to the Agreement signed by the Heads of State (Lubumbashi, December 9, 1979) the general objective of IRAZ is "to rationalize agricultural research in the Community". To this end, IRAZ would engage in "the study and execution of projects of common interest in the field of crop and animal production".

The Directors General of the three national agricultural research institutes, who met to discuss the role of IRAZ on May 21, 1980, specified that the task of IRAZ was to strengthen co-operation between their three institutes so as to avoid duplication, while the autonomy of these national institutes was to be safeguarded.

The Constitutive General Assembly of IRAZ (Bujumbura, July 9-12, 1980), with reference to the Lubumbashi Agreement, emphasized that the principal purpose of IRAZ was research. It also found that "it would be difficult for the Institute simultaneously to conduct research studies and to execute projects" and recommended "that the execution of projects be excluded from the range of activities of IRAZ or at least that it would engage in this only in exceptional cases". Yet in the Constitution, as adopted by the General Assembly, the wording in the Lubumbashi Agreement (given above) was retained, 1) with a proviso that the program would be determined by the "responsible bodies of the CEPGL".

The detailed list of functions of IRAZ (taken from the Constitution and given below) strongly suggests a support/coordination role for IRAZ. The functions listed are inter alia:

- (i) Making an inventory of common agricultural resources in the Community, analyzing all pertinent problems and setting up a data bank of all information needed for the realization of its objectives. 2)
- (ii) Carrying out feasibility studies and studies on the implementation of projects of common interest to the Community in the field of agriculture.
- (iii) Supplying member states with the results of studies and enquiries in the various fields assigned to the Institute.
- (iv) Collaborating with the member states in the formulation of its 2) research programs and in the rational utilization of their agricultural resources so as to make their economies increasingly complementary.
- (v) Establishing and strengthening the relations with national and international bodies dealing with agricultural questions, by intensifying the exchange of information and plant and animal material for research.
- (vi) Organizing meetings of experts and seeking assistance from international, regional and bilateral organizations towards the fulfilment of its objectives.

Since Article 11 of the Constitution of IRAZ specifies that the General Assembly is the supreme authority of IRAZ, there appears to be a lack of consistency between the wording adopted in the Constitution

- 1) The ambiguity concerns a possible executive role for IRAZ.
- 2) 'Its' refers to IRAZ.

on the one hand, and the report of the Bujumbura meeting on the other. The nature of the work to be done by IRAZ will be determined by the interpretation placed on the reports and resolutions of the General Assembly, so this issue is in urgent need of clarification.

There are three national research institutes (ISABU, ISAR and INERA) each with its own infrastructure and having similar structure and virtually the same objectives and orientation.

*** The mission feels that IRAZ should direct all its efforts towards strengthening these institutes and promoting close collaboration among them to ensure the efficient use of scarce resources.

The institutes can be strengthened by providing support services, carrying out background studies and surveys, co-ordinating national research programs and stimulating new research initiatives of interest to the region - rather than by IRAZ involving itself directly in research of its own, since this would risk competition with and duplication of ongoing efforts or at least would fail to make use of and to reinforce the physical and human infrastructure of the national systems.

*** The mission supports the General Assembly's statement that project execution should be excluded from the activities of IRAZ.

Geographic coverage

As a constituent institution of the CEPGL, IRAZ is constrained to address itself to agricultural research problems of common interest to the member states: Burundi, Rwanda and Zaire.

*** As applied agricultural research is closely tied with ecological, agro-climatic, socio-cultural and economic conditions, it is natural that most if not all of the Institute's activities should be confined to a geographical region characterized by common conditions. This region is composed of Burundi, Rwanda and the corresponding ecological regions in Zaire.

Ecological, agro-climatic and socio-economic conditions in the other parts of Zaire have little in common with those prevailing in any part of Burundi or Rwanda. Moreover, the territory of Zaire covers over 97.7% of the total territory of the Community; if IRAZ were to play a role in agricultural research for the whole of CEPGL territory, it would have to spend a large part of its resources on the 95% of Community territory which lies outside the agro-ecological area mentioned above. In doing so it would, to a large extent, duplicate the work of INERA, which is responsible for the execution and co-ordination of agricultural research in all of Zaire.

A wider geographic coverage could possibly be given to some of the service activities of IRAZ, although even here caution is required to avoid a loss of focus and dissipation of resources.

While the mission has no doubt as to the scientific validity of its conclusion regarding the appropriate geographical coverage for the activities of IRAZ, it recognizes that the decision must be made by the Governments of the three countries concerned. It is important, however, that this issue be resolved to enable IRAZ to begin to make its intended contribution in support of research and development.

In the remainder of this report the terms "region" and "regional" will refer to the geographic area composed of Burundi, Rwanda and the regions in Zaire which are ecologically similar.

Program Proposals

A program for IRAZ must take into account the policies of the three CEPGL countries as indicated in their national development plans. A high degree of similarity of objectives, policies and strategies exists among these plans. In all three countries, the priority objectives for agricultural development, and consequently for agricultural research, are (in this order):

1. To satisfy the basic food needs of the people in the CEPGL member states.
2. To intensify export crops and those for local agro-industries.
3. To promote modern methods of animal production.

These shared objectives provide the basis for the determination of regional priorities and for co-operation with IRAZ. In line with the importance of the first priority item, and having regard to the early stage of development of IRAZ, the mission's suggestions with regard to the coordination of research programs are limited to food crops.

The mission considers that an action plan for IRAZ would best be developed in terms of two broad categories of activities:

(i) general support services and (ii) co-ordination of research programs. Some activities in each of these categories could - and should - be started immediately, others would come at a later stage of IRAZ development. At present it is impossible to suggest a detailed time-frame, but all proposed activities could be initiated in the short- (years 1 - 5) and medium-term (years 6 - 10).

*** As a general guideline the mission feels that IRAZ should concentrate on program items that do not require large investments but which could give immediate benefit to the three national research systems.

Maximum use should be made of the research manpower and infrastructure of these systems, both to rationalize resource utilization and to strengthen their capacity. In planning new activities, one must always bear in mind that most of those underway must continue or expand.

Under 'General support services' are grouped a range of co-ordinating, catalytic and supporting functions that provide the basis for or strengthen inter-institutional co-operation generally. Ten specific proposals are made in Section IV (p. 9-12).

In addition, IRAZ could play an important co-ordinating role in several key commodity research programs (which are currently being conducted in parallel by the three national research institutes, with little co-operation and much duplication) and in promoting new crops programs as well as cropping and farming systems-oriented research. The IRAZ role would be mainly to convene inter-country technical meetings, to assist in the forging of operational links between national programs - including the sharing of services, physical infrastructure, specialized and skilled manpower and external consultants - and to seek additional resources. Proposals for such programs are detailed in Section IV (p. 12-16). The development of these co-ordinated research programs can follow a standard pattern of operational procedures, as proposed on p. 17-18.

Headquarters Location

The IRAZ Constitution stipulates that the Institute's headquarters shall be at Gitega in Burundi. It also states that it can be transferred to any location within Burundi or to another member state by decision of the Conference of Heads of State of the CEPGL.

The mission appreciates the reasons that led to the choice of Gitega. It is aware that a 462-ha site near Gitega was donated to IRAZ by the Government of Burundi and that the Management Committee wishes to start physical developments at this site as soon as possible.

If it is accepted that the role of IRAZ is to support, co-ordinate, catalyze and harmonize activities of the national research institutes rather than to execute projects of its own, it seems that the development of a large agricultural site is not a priority requirement. In fact, the large amounts of time and money that would go into such a development, would seriously detract from the Institute's main purpose.

*** The mission urges therefore that for the time being development of the Gitega site be given low priority in the allocation of resources.

What IRAZ seems to need for an efficient start is an adequate number of offices, rooms for documentation and production of reports, access to meeting rooms with proper facilities and adequate staff housing. In principle, these facilities could be developed at Gitega, where the present limited staff have found both office accommodation and housing. The present situation, however, (with headquarters at Gitega) causes the unproductive use of a great deal of staff time and funds, because of the necessity of travel to the capital, Bujumbura, for most communications, supplies and services.

An institute like IRAZ must rely heavily on efficient postal, telephone, telegraph and telex links and air communication. At present and probably for some considerable time to come, Bujumbura is much better placed than Gitega for these essential services. Bujumbura also

has other advantages for IRAZ, including: the presence of government ministries, embassies and representatives of international agencies; the presence of ISABU headquarters and central facilities, and of the Faculty of Agriculture of the University of Burundi; a more central location vis-à-vis both Rwanda and Kivu; much better supply, servicing and repair facilities; better facilities for meetings and conferences; and a wider range of educational facilities and personal amenities.

Although the mission has been informed that Gitega might ultimately become the capital of Burundi, it believes that much time will elapse before the site can meet the essential needs of a regional institute.

*** It is recommended, therefore, that serious consideration be given to accommodating IRAZ headquarters at Bujumbura until such time as Burundi's central administration will have moved to Gitega; as a minimum action, the mission recommends the setting up of a liaison office in Bujumbura, linked by two-way radio to the IRAZ premises at Gitega.

This latter action would pay for itself quickly in reduced transport costs and would permit important savings in staff time, provided a senior staff member is posted at Bujumbura. The mission re-emphasizes, however, that it regards the solution of moving IRAZ headquarters as a whole to Bujumbura as a far better alternative.

IV. Program Details

General Support Services

The mission attempted to group these services in priority classes, but found no valid basis for doing so. The Management Committee of IRAZ may be able to establish a priority order when the findings are available from the mission of national consultants. At that stage the Committee may wish to add some other support services to the list. The mission's suggestions enumerated below are arranged as far as possible from the more basic and general to the specific. Items 1 - 5 are aimed at giving IRAZ a minimum data base for the execution of its mandate. Items 6 - 8 are concerned with various aspects of communication within the region and with other countries. One suggestion deals specifically with phytosanitary control measures (item 9), while the last is related to specific co-operative research programs in the Community (item 10).

1. Institutional register

Collecting and compiling detailed information on all agricultural institutes, stations and experimental sites in the region. This might be handled according to the CARIS format (FAO). Some of the information would need regular updating (staff, special facilities, expenditures, etc.). Other information would be constant and collected only once (altitude, rainfall and temperature regimes, major soil types, etc.). The network of stations and the geographical areas in the region for which they are representative, might be shown on a map.

2. Project registration system

Preparing and keeping up to date an information system of all agricultural research projects in the region, containing for each project concise information on its objectives, activities, locations, duration, staffing, expenditure, funding sources and annual progress. Such a central registration system would greatly facilitate information exchange, co-ordination, monitoring and inter-country efforts to minimize duplication.

*** It is suggested that the Management Committee of IRAZ instruct the national consultants' mission to structure their inventory of agricultural research in the Community in such a way as to facilitate processing.

3. Manpower inventory

Preparation and regular updating of a card index of:

- a) Present manpower for agricultural research (all national and expatriate research staff and technicians) giving for each person the following information: name, nationality, degrees and diplomas, field of specialization, present and past positions with dates and main assignments, special skills.
- b) Potential research manpower, notably students presently enrolled at universities and technical schools as well as research staff currently attending postgraduate or special training courses in the region or abroad, giving for each person the following information: name, nationality, past education, present institute of learning, type and duration of training and field of study, sponsor.

This information would constitute a first step towards manpower planning for the national agricultural research services of the Community and would help provide a sound base for the programming of research and the planning of training programs in general agriculture and the various fields of specialization.

4. Libraries' catalogue and documentation exchange

Preparing a complete catalogue of all holdings - periodicals, books, reports, etc. - of the libraries of ISABU, ISAR and INERA-Kivu and their sub-stations and of the three faculties of agriculture. This would permit easy retrieval and exchange of bibliographic material (originals or, more likely, photostat copies). It would also help avoid unnecessary duplication of library acquisitions from scarce funds, and would enable the national agricultural libraries in the region to gradually achieve some measure of complementarity.

To facilitate documentation exchange, IRAZ should try to assist the national libraries and at least the specialized stations in setting up reproduction services and facilities. It may consider incorporating this into a project proposal aimed at reviving the national libraries, which have had few acquisitions since the early 1960s (Mulungu has had none since 1960).

5. Germplasm registration

Development under the auspices of IRAZ of a standard methodology to be used by plant introduction services of the three countries for the registration of characteristics and performance of plant material of local and foreign origin. This would facilitate the exchange of up-to-date information on existing genetic stock and new entries. It would permit IRAZ to maintain a register of all genetic material of important crop plants in the region, avoid duplications or synonyms, and organize more systematically and rationally the exchange of genetic material within the region as well as the introduction of new germplasm for common projects.

In order to ensure that its registration system conforms to international standards, IRAZ should consult the IBPGR Secretariat in Rome*) and should adopt the IBPGR descriptors for germplasm.

6. Bibliographic notes and circulars

Issuing circular letters and bibliographic summaries on research problems of common concern. This could include brief reports on meetings and conferences held in Africa and elsewhere, which are relevant to agricultural research and development in the CEPGL member states. IRAZ should stimulate staff of the national research systems to produce notes and summaries on progress in their work and might invite foreign cooperating agencies to regularly produce information on their activities in the region.

7. Links with faculties of agriculture

Stimulating functional links between the national research institutes and the faculties of agriculture, for instance:

- assigning final-year students to research stations and ensuring that student thesis research is directed to national and regional priority problems;
- inducing research staff to give lectures at the faculty of agriculture;
- facilitating the participation of teaching staff in the national research programs;
- commissioning special studies of national or Community interest to the faculties of agriculture.

8. Exchange of information and material with other countries

Preparing a list of relevant agricultural research institutes and stations situated in regions with similar agro-ecological conditions, followed by correspondence aimed at regular exchange of information and documentation on research and development problems of common interest. A study on "agro-climatic analogues" for Burundi, Rwanda and Zaire has already been published (Dr. J. Henry, Belgium) and would be a useful tool. This study would also be valuable for identifying plant material of potential economic importance that might be successfully introduced into the IRAZ region.

*) International Board for Plant Genetic Resources (IBPGR),
c/o FAO, Via delle Terme di Caracalla, 00100 Rome, Italy.

9. Phytosanitary control

Requesting FAO to (i) review the present phytosanitary control situation in the three CEPGL countries, (ii) identify deficiencies in legislation or practice and (iii) recommend concrete unified or parallel measures to be taken by the three countries individually or collectively.

It is recommended that, prior to making this request, IRAZ convene a technical meeting of plant pathologists, entomologists and breeders of the three national systems, to prepare a background document on: the present situation in regard to phytosanitary legislation, regulations, formal procedures and actual practices relating to plant introduction of various categories of crops in the region; the main omissions, shortcomings and discrepancies and the ensuing risks of introducing plant diseases; and possible improvements and harmonization of phytosanitary control in the three countries.

10. Meetings, visits, consultancy missions

Organizing meetings and field visits for the research and extension staff of the three countries (and invited foreign specialists as appropriate) to resolve questions connected with the implementation, current field operations and monitoring of co-operative research activities, to discuss results and their applicability and to obtain feed-back from the field for the direction of future work.

Organizing consultancy missions for the planning, programming and evaluation of co-operative research activities.

Co-ordination of Research Programs

It is suggested that first priority should be accorded to important food crop programs for which there already exists a framework for regional action (items 1 and 2 below). Second priority should be given to some other important staple foods on which all three countries conduct research but for which no framework for co-operation exists (items 3 and 4).

As soon as IRAZ has gained experience in co-ordinating these crop research programs, it could initiate activities involving crop and systems management aspects, for which international scientific technical backstopping is less easily available or organized (items 5 and 6). Making a definite choice of crops and problem areas would be a task for IRAZ and the national research directors when the results are available from the forthcoming mission of national consultants.

1. Potato

There is already an ISAR/CIP program for potatoes in Rwanda, located at Ruhengeri. This has a regional component in the sense that plant material is being distributed for testing in Zaire (Kivu), Burundi and other countries, including Madagascar.

National activities in Rwanda (Ruhengeri), Burundi (Kisozi) and Kivu (Mulungi) are mainly concerned with introduction and selection of new genetic material (CIP) and improvement of cultural practices (both to control blight and bacterial diseases), storage, quality seed production and extension activities.

*** Since the three countries have similar needs and priorities, IRAZ should enter into early negotiations with ISAR and CIP to set up a truly regional potato research program for the CEPGL countries, with Ruhengeri assuming regional responsibilities in addition to being a national station of ISAR.

2. Sweet potato and cassava

There is an ISAR/IITA proposal (submitted for funding to the United States Agency for International Development) for a 'Rwandan National Sweet Potato and Cassava Improvement Program', which would ultimately be extended to other countries of eastern Africa - including Burundi and eastern Zaire. Zaire has a national cassava improvement program (PRONAM, M'Vuazi, Bas-Zaire), but it is probably of limited interest for high-altitude conditions. It is suggested that IRAZ review these programs and, particularly, that it determine, with the Rwandan Government and IITA whether and how the ISAR/IITA project proposal could be regionalized for the CEPGL from the outset. This seems all the more justified in view of the high operational budget envisaged in the present proposal.

3. Grain legumes

Grain legumes - particularly beans - are the main dietary sources of protein in the region, and co-ordination of the national grain legume programs is urgent and of great potential benefit.

ISABU, ISAR and INERA are separately conducting similar research programs in grain legumes: beans (Phaseolus vulgaris), Vigna spp. and Vigna unguiculata, soybean (Glycine max), groundnuts (Arachis hypogaea) and peas (Pisum sativum). There is no co-ordination or formal co-operation between these programs.

The greatest emphasis in attempts to co-ordinate this research should be accorded to Phaseolus, which is the dominant legume at intermediate and higher altitudes (1200 - 2100 m). For low altitudes (800 - 1200 m), Vigna unguiculata could advantageously replace Phaseolus. As regards groundnuts, the main requirement is to screen introduced material for cold tolerance and early maturity, both for high altitude cultivation and for dry-season cropping in swampy valley bottoms.

There is probably a high potential for soybean production in the region. A program for the region would have to include screening and multi-locational trials as well as the development and testing at village level of suitable processing techniques and recipes, prerequisite for getting soybeans accepted as a food crop. In addition to the value of soybeans as a food, and also as a cash crop, soybean cake is an excellent concentrate for dairy cattle and could help overcome shortages of fodder, particularly in the dry season.

*** It is recommended that IRAZ initiate early discussions with the leaders of the national research institutes and their grain legume specialists with a view to identifying areas of common interest. (There are considerable opportunities for assistance from international centres and agencies: CIAT for beans, IITA for Vigna and soybean, ICRISAT for groundnuts and IDRC for peas.) For beans, close cooperation with the Grain Legume Project in Kenya (Thika) is strongly suggested.

IRAZ may find it desirable to make a concerted approach to working with several of the IARCs of the CGIAR. ISNAR may be called upon to assist in such an approach if this meets with the approval of the three national research institutes.

4. Maize

There is scope for improved co-ordination of screening trials of maize between the three countries. IITA could be approached for advice on a selection program for adaptation to mixed cropping based on crosses between local varieties and material from CIMMYT/IITA and Kenya, through an inter-country network of sites in different environments (altitudes). IITA could be asked in particular to study the feasibility of a program similar to the Zairean 'Programme National Mais' (PNM) to cover the needs of the medium- (Ruzizi, Mosso, Karama) and high-altitude regions of the Community.

The mission has noted that local varieties and land races frequently outyield the best introduced lines in farmers' fields, even though the latter had performed better in screening trials and multi-location trials. It is suggested, therefore, that the specialists who prepare or scrutinize proposals on maize, grain legumes, sweet potato and cassava consider the possibilities of screening varieties not only in monoculture but also - particularly at more advanced testing stages - in mixed cropping patterns as used in traditional farming practice.

5. Grasses and fodder legumes

All three countries use the same few fodder crops: Tripsacum laxum, Pennisetum purpureum, Pennisetum purpureum "Cameroun", Setaria sphacelata, Setaria splendida, Brachiaria spp., Stylosanthes spp., Desmodium spp.

There is a good case for the three countries, under the aegis of IRAZ, jointly to introduce and test a larger number of pasture grasses and fodder legumes originating from countries with similar altitudes and agro-climatic conditions, e.g. Colombia, Peru, Bolivia, Kenya, Tanzania and Papua-New Guinea. Expanded fodder crop programs should also include fodder trees and shrubs, which would fit well into and contribute to the agro-silvo-pastoral systems of the region.

*** Apart from the obvious goal of selecting species and ecotypes with high yields and high nutritional value and palatability, special attention should be given to grasses and legumes for soil conservation and erosion control: e.g., grasses for consolidation of contour bunds and waterways, and for mulch; legumes as cover crops and for green mulch. A special case is Stylosanthes which is currently being virtually destroyed by the spread of anthracnose all over Africa. As CIAT is specifically engaged in research on diseases and the genetic improvement of Stylosanthes species, it is suggested that IRAZ request CIAT's assistance.

Co-ordinated work of this kind will require standard procedures for evaluation of pasture productivity and charge capacity, for digestibility analysis, etc., to ensure comparability of data. It also demands detailed arrangements and adequate facilities for the safe introduction of plant material of different kinds and for their efficient multiplication and distribution. Important also are professional contacts with institutions likely to provide technical and scientific backstopping (e.g., CIAT) and a multidisciplinary resident cadre of experienced research workers supported by modern analytical facilities in one of the national institutes.

The national institutes will have to equip themselves scientifically and IRAZ administratively to handle co-operative programs of this level of complexity. Several years of preparation will be necessary including time for training of staff.

6. Cropping and farming systems research

The programs of the three national research institutes are conspicuous for their "vertical" organization: almost all research is organized by crops or groups of crops; lacking are "horizontal" connections which link them into cropping and farming systems.

*** The mission believes this to be a major weakness of current research programs, and that farming systems research needs to be initiated without delay if substantial improvements are to be achieved in traditional (largely subsistence) farming and food self-sufficiency.

This is all the more important in view of the high and increasing population density in most of the highlands and the consequent pressures on the land.

Cropping systems and farming systems research must be conducted at the national and sub-national level because of the local specificity of environmental, socio-economic, cultural, political and other non-technical factors. However, IRAZ could assume a stimulating and co-ordinating role, particularly with respect to adoption of common methodologies and in making arrangements for staff training.

The mission believes that the correct approach to farming systems research and development at the level of small farmers is:

- (i) To determine and understand what farmers do - i.e. understand the existing systems which have evolved from farmers' experience over many years.
- (ii) To determine and understand why farmers do what they do - i.e. understand the economic, social, cultural and technical basis for present farming systems, including farmers' perceptions of constraints, uncertainties and risks.
- (iii) To introduce improvements into the existing system on the basis of available knowledge, without making fundamental changes in the nature of the system.
- (iv) To determine what technical and socio-economic research is needed to further improve the system.

The mission has learned that both Burundi and Rwanda are initiating farming systems research.

*** In the immediate future, I.RAZ can do no more than support the development of these two national programs and stimulate the closest possible interaction between them, including meetings for all local and expatriate scientists involved, with experts invited from abroad.

Although farming systems research should start with trying to gain a complete understanding of what farmers do - and why - in certain respects such knowledge and insight already exist or can be obtained by simple observation. It may be appropriate therefore for I.RAZ and the national institutes to consider whether some of the many small scale and simple "technologies" existing elsewhere might not be introduced and tested for adoption in the region. Some suggestions are offered in Annex 3.

The above six suggestions do not exhaust the possibilities for short- and medium-term co-ordinative action on the part of I.RAZ. But the mission has deliberately limited itself to crops and problem areas which it considers basic in the context of the socio-economic, geographic and food-supply situation in Burundi, Rwanda and Kivu. When the national consultants have completed their in-depth inventory of agricultural resources and research in the Community, it may be necessary to re-examine and perhaps revise these proposals.

Future additions to the program

It does not seem useful to produce a long list of crops or research problems that might ultimately be included to the program of I.RAZ. However, as an indication of further possibilities in the area of food crops, the mission mentions bananas (both table and plantain varieties), wheat and triticale.

*** The mission does not feel justified at this early stage to make suggestions in the areas of export crops and live-stock beyond stating that these should not be considered by IRAZ in the short term.

At some stage of development, IRAZ might envisage the need for certain specialized laboratories and technical services not yet available in the Community, particularly in connection with the development of IRAZ-coordinated research projects. These might include:

- Plant quarantine facilities (reference to improved phytosanitary control regulations).
- Laboratory for applied Rhizobium research (reference to grain legume program).
- Tissue culture laboratory (for the production of healthy plant material of potato, sweet potato, cassava, etc.).
- Laboratory for food digestibility analysis (reference to research on grasses and fodder legumes).
- Biometrics bureau (for experimental design, analysis and interpretation).

*** Whenever possible, such new infrastructure should be established within existing research stations, both for the sake of economy and to permit the mutual reinforcement of activities.

An example of such possibilities is the existence at Mulungu (Kivu) of three air-conditioned greenhouses which could be remodeled for a tissue culture program; in such a context Mulungu would, in addition to being a national (INERA) station, function as a regional service for this particular endeavour.

Procedures for Co-ordinating Research Projects

Once the priority themes for research co-ordination by IRAZ have been agreed upon and approved by the General Assembly, it is suggested that the following general procedure be followed for implementation of each program item:

- a. Compilation and analysis of all relevant work carried out by each national institute and previously by INEAC, including in the case of crops a complete list of all past introductions and variety trials with an appraisal of their results. This should be done by a team of research workers from the three countries, who would themselves decide their respective tasks and responsibilities. In some cases it may be desirable to appoint one or more external consultants to assist the resident scientists, or it may be necessary to assign the chief role to an eminent scientist from abroad or to an international institute. But the active involvement of resident scientists, particularly nationals of the CEPGL countries, is essential in every instance.

b. Technical meetings sponsored by IRAZ of all national and expatriate research workers currently engaged in the program item in question - assisted as necessary by external specialists - in order to:

- identify the main production constraints at the farmers' level;
- interpret the above analytical report in the light of these current production constraints, and determine which materials and practices are still relevant and promising;
- develop a co-ordinated research strategy for addressing the farmers' constraints, and propose to IRAZ and the national research institutes a series of specific actions as well as a delegation of various tasks to the respective institutes, stations, laboratories and individual scientists.

c. Joint formulation of a final proposal for a co-ordinated or joint research (of research-cum-extension) project. This would be done by a team of resident scientists and external consultants, together with the national research directors and IRAZ. The project document would specify the time frame; the distribution of tasks over the respective research institutes and stations; capital investment needs (if any), staffing requirements and operational budget on a year-by-year basis; staff training needs (including technicians); and anticipated needs for specialist consultants. An experienced scientist from one of the three countries would be formally designated as technical co-ordinator of the project on behalf of IRAZ.

d. Formal approval of the project proposal by the Directors General of the three national research institutes and the IRAZ General Assembly.

e. Submission by IRAZ of the project proposal to technical assistance agencies.

f. Technical assistance agreement, which should include suitable provisions for (i) regular technical/scientific meetings of the research workers involved, (ii) the efficient functioning of the technical co-ordinator (including funds and flexible arrangements for visits to project sites and related programs in neighbouring countries, (iii) regular monitoring and (iv) periodic evaluation.

g. Execution of the project under the aegis of IRAZ, but with responsibilities shared approximately as follows:

- Technical co-ordinator: responsible for scientific and technical co-ordination, with funds for co-ordinating activities assured by IRAZ. The co-ordinator would report in writing to IRAZ with copies to the Directors General of the national research institutes;
- Directors General of the national research institutes: responsible for the satisfactory execution of all research tasks assigned to stations and staff under their jurisdiction. They would report to the Director General of IRAZ on research progress and would account for funds channelled to their institutes through IRAZ;

- Director General of IRAZ: ultimately responsible for scientific and technical progress and for all funds provided to IRAZ for the project. The Director General would be the prime mover in attempts to overcome constraints to efficient project implementation (funding, staff training, movements of staff and research materials, etc.); would maintain contacts with technical assistance agencies; and would be responsible for organizing regular monitoring and periodic evaluation by competent teams. The Iraz Director General would report in writing to the Iraz General Assembly, with copies to the Directors General of the national research institutes.

19. Projet de recherche sur les techniques de mise en valeur des terres agricoles dans la cuvette zairoise: étude comparative des effets de systèmes cultureaux sur l'évolution et la conservation du sol. INERA, 1980.
20. Plan d'action du Département de l'Agriculture et du Développement Rural pour l'exercice 1980. Kinshasa, le 8 février 1980.
21. Le Programme National Maïs (PNM): origine, objectifs et réalisations. Présenté à la 6ème Foire Nationale de Kinshasa.
22. Liste de thèmes de recherches dans la Réserve Floristique de Yangambi. Dept. de l'Environnement du Zaïre/Projet MAB-UNESCO, Yangambi, 24.8.1978.
23. Rapport Annuel d'Activités Scientifiques des Chercheurs, Projet MAB/Yangambi, décembre 1980.
24. Conclusions du Séminaire sur les Politiques Alimentaires et Nutritionnelles, Kigali, 9 - 11 septembre 1980.
25. Allocution de S.E. F. Nzamurambaho, Ministre de l'Agriculture et de l'Elevage lors de l'ouverture du Séminaire sur les Politiques Alimentaires et Nutritionnelles, Kigali, le 9 septembre 1980.
26. Politique agricole. Gouvernement du Burundi.
27. Politique de promotion de l'élevage au Burundi. Ministère de l'Agriculture et de l'Elevage, Bujumbura.

Received in the Course of the Mission

1. ISABU, Centre Zootechnique de la Luvyironza. (Note préparée par le Directeur de Station, M. J. Ruvakubusa).
2. ISABU, Station Expérimentale de Kisozi. (Note préparée par le Directeur de Station, M. D. Barambana).
3. ISABU, Station Zootechnique de la Basse-Ruzizi. (Note préparée par le Directeur de Station, M. Nyole Hassani et le Chef du Département de Production Agricole, M. P. Pozy, 1981).
4. ISABU. Recherches en production végétale. (Note préparée par le Directeur Général de l'ISABU, Dr. J. Kafurera).
5. ISABU. Rapport des Recherches Agronomiques, 1980.
6. ISABU. Programme annuel 1981-82: Groupe des Légumineuses.
7. Devos, P. Proposition d'un programme quinquennal sur légumineuses à graines. (ISABU), le 3 juin 1981.

8. ISAR. Compte rendu des travaux du Département 'Production Végétale' en 1979.
9. ISAR. Rapport Annuel (Résumé), 1979.
10. ISAR. Projet de Programme 1980. Juin 1979.

Available for Consultation at IRAZ Headquarters

1. Comptes rendus des travaux des départements 'Production Végétale' et 'Production Animale' de l'ISAR (Rwanda), 1978, 1979.
2. Planification de la recherche forestière au Rwanda.
3. Rapports Annuels de l'INERA, 1978, 1979.
4. Réorientation de la recherche et restructuration de l'INERA, 1974.
5. Rapport Annuel du Programme National Manioc (PRONAM) au Zaïre, 1979.
6. Rapport Annuel du Ministère de l'Agriculture et de l'Elevage, Rwanda, 1979.
7. Rapport Annuel de Ministère de l'Agriculture et de l'Elevage, Burundi, 1978.
8. Programme de Recherches ISABU 1980-1981.
9. Programme 1980 INERA.
10. Climatologie INERA (2 tomes).
11. Bulletin Agricole du Rwanda.
12. La vulgarisation au Rwanda.
13. Table Ronde des Aides Extérieures pour le Secteur Rural, Bujumbura, 13-15 nov. 1979.

Program of Visit

May 25 Arrival in Bujumbura of Dr. R. Devred. Study of basic documents. Meeting with the Management Committee of IRAZ:

Mr. L.T. Bajika	Director General	(Zaire)
Mr. J-B Nezehose	Directeur	(Rwanda)
Mr. D. Ngendahayo	Directeur	(Burundi)

May 26 Study of IRAZ documentation (contd.)

May 27 Arrival of Dr. R.B. Contant. Meeting with the Management Committee of IRAZ: orientation and organization of the mission. Dinner at the "Entente Sportive" with Mr. Bajika, Mr. Ngendahayo and Mr. J. Kafurera, Director General of ISABU (at the invitation of IRAZ).

May 28 Visit to ISABU Headquarters, Bujumbura and to the Imbo Station, the Gifurwe State Farm and the Rukoko Station of ISABU in the Ruzizi Plain. Departure for Gitega.

May 29 Courtesy visit to the Governor of Gitega Mr. J.B. Basemmingera. Visit to the Kisozi Station of ISABU (Director Mr. Barampana).

May 30 Visit to Luvyironza Station (Mr. J. Ruvakubusa). Departure for Mosso.

May 31 Visit to Mosso Station (Mr. R. Baragengana, Director) Departure for Gitega.

June 1 Visit to Murongwe Experiment Centre (Director: Mr. E. Niyonkuru) Visit of IRAZ site near Gitega. Visit to the "Institut Technique Agricole du Burundi" (ITAB) (Director: Mr. Rishirumuhirwa). Work on draft mission report.

June 2 Departure for Butare, Rwanda. Official visit to the Prefect of Butare. Visit to the Rubona Station of ISAR (Mr. Mpabanzi A., Chief, Dept. of Crop Production).

June 3 Visit to the "Université Nationale du Rwanda" (Mr. H. Sadeghi) Visit of Songa Livestock Centre (Director: Mr. Th. Budjangwe). Visit to Rubona Station for discussion with Mr. F. Iyamuremye, Director General of ISAR. Departure for Kigali. Arrival of third mission member Dr. T.L. Lawson, IITA.

June 4 Official visit to the Secretary General of the Ministry of Agriculture in Kigali. Visit to Karama Research Station of ISAR. Return to Gitega. Meeting with Mr. Bajika (late evening).

June 5 Meeting with the Management Committee of IRAZ.
 Departure for Bujumbura.
 Visa and travel arrangements for visit to Kivu, Zaire.

June 6 Departure for Bukavu and Mulungu.
 Visit of the INERA Research Station at Mulungu and discussions with the Director, Mr. N. Mundundu and some of his staff including the Ag. Head of the USAID team, Dr. P. Carroll of MASI (Multinational Agribusiness Systems Incorporated).

June 7 Visit of Mulungu experimental fields.
 Departure for Bujumbura.

June 8 Official visit to the Minister of Agriculture and Livestock, Mr. Baradandikanya (current Chairman of the General Assembly of IRAZ).
 General discussion and verbal presentation of the mission's views and conclusions at ISABU Headquarters.
 Present: Mr. Kafurera, Mr. Dewey, Mr. Bajika, Mr. Ngendahayo and the members of the mission.
 Visit to the Faculty of Agriculture of the University of Burundi.

June 9 Departure for Nairobi.
 Work on draft mission report.

June 10 Work on draft mission report.
 Visit to USAID/REDSO East Africa (Mr. C.L. Martin, Agricultural Development Officer).

June 11 Departure of Dr. Lawson for Nigeria.

June 12 Departure of Dr. Devred for Togo and of Dr. Contant for the Netherlands.

Documents Provided to the Mission

On Arrival

1. Accord portant création de l'Institut de Recherche Agronomique et Zootechnique de la Communauté Economique des Pays des Grands Lacs. CEPGL, Gisenyi, 1979.
2. Procès-verbal de l'Assemblée Générale Constitutive de l'Institut de Recherche Agronomique et Zootechnique (IRAZ), Bujumbura, 9-12 juillet 1980. CEPGL, Gisenyi, 1980.
3. Coopération dans le domaine de la recherche agronomique au sein de la CEPGL. Secrétariat Exécutif Permanent, CEPGL, Gisenyi, 1979.
4. Quelques principes de la politique agricole et zootechnique de l'Institut de Recherche Agronomique et Zootechnique. CEPGL, Gisenyi, 1980.
5. Statut de l'Institut de Recherche Agronomique et Zootechnique (IRAZ) de la CEPGL. (Adopté par l'Assemblée Générale à Bujumbura, le 11.7.1980).
6. Procès-verbal de la deuxième Assemblée Générale de l'Institut Agronomique et Zootechnique (IRAZ) de la CEPGL, Bujumbura, 23-24 décembre 1980. IRAZ, Gitega, déc. 1980.
7. Organigramme et attributions des services de l'IRAZ. IRAZ, Gitega, 1980.
8. Rapport trimestriel d'activités de l'IRAZ. IRAZ, Gitega, le 10.1.1981.
9. Rapport succinct des activités de recherches dans la Station Expérimentale de Kisozi, Burundi.
10. Centre Zootechnique de Luvyironza de l'ISABU.
11. Rapport succinct des activités de recherches dans la Station ISABU Mosso.
12. Station Zootechnique de la Basse-Ruzizi, ISABU-Rukoko.
13. Bicamumpaka, M. et al. Programme National d'Amélioration de la Pomme de Terre (PNAP), Section de l'ISAR (Rwanda). Allocution d'inauguration.
14. Aperçu sur les travaux de recherche à l'INERA-M'Vuazi depuis 1978/79.
15. Informations sur le Secteur Nord-Est de l'INERA, Nioka, Mars 1981.
16. Muzinga Kanzila et al. Niveau atteint par le programme de recherches zootechnique, agrostologique et vétérinaire dans le Secteur Nord-Est de l'INERA - impact de ces recherches sur l'élevage régional. Présenté à la Réunion des Chercheurs INERA, Kisangani, févr. 1981.
17. Mundundu Ndonambah. Etat actuel de la recherche agronomique au Secteur du Kivu et son impact sur le développement. INERA, Mulungu, 1981.
18. Carroll, P.H. Guide pour le contrôle d'érosion et de sédimentation dans la Station de Recherche de Mulungu. MASI/INERA Projet de Support, Mulungu, 1981.

Examples of Technology for Small Scale Rural Development

Small scale technology results from adaptive research for various sectors of rural life and development. It is concerned particularly with the adaptation to new situations of simple low-cost techniques, often well known and already used elsewhere. For purposes of illustration, the following activities can be mentioned:

- (1) simple agro-forestry techniques combining fruit and fodder trees and shrubs for hedges and enclosures;
- (2) fast-growing trees and shrubs for fodder, firewood and charcoal production (e.g., Sesbania bispinosa) and delimitation of paddocks;
- (3) rationalization of compost production and organic matter recycling at farm level;
- (4) rearing of small animals: rabbits, milch goats;
- (5) improvement of the use of animal draught power and small equipment for animal traction;
- (6) improvement of small tools, implements and small equipment for decorticating, milling, etc.;
- (7) testing of "pack animals" (donkey, mule) to save time and energy in carrying harvests, water, organic matter, wood, peat-bog, etc.;
- (8) improvement in home-made pest and rodent-proof storage and conservation constructions for crop seeds and produce;
- (9) any other small-scale and low-cost technologies relevant to improving the well-being of small households (e.g., capture and storage of rain water for drinking, simple prefabricated kitchen stoves, etc.).



