PD-AAZ-382

USAID KINSHASA, ZAIRE
APPLIED AGRICULTURAL RESEARCH AND OUTREACH PROJECT
660-0091

THRESHOLD DECISION EVALUATION
DECEMBER 1988

CHEMONICS INTERNATIONAL
CONSULTING DIVISION

MILES G. WEDEMAN	TEAM LEADER
ERIC F. TOLLENS	AGRICULTURAL POLICY SPECIALIST
JACQUES C. DENIS	PLANT BREEDER
GARY E. NEILL	FSR/EXTENSION SPECIALIST

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ACRONYMS

AVRDC	Asian Vegetable Research and Development Center, Taiwan
BEAU	Bureau d'Etudes et d'Amenagements Urbains, Department of Public Works
B.I.	Budget d'Investissement, GOZ
B.O.	Budget Ordinaire, GOZ
BUNASEM	Bureau National des Semences (National Seed Bureau), DOA (World Bank/FAO)
CEPGL	Communaute Economique des Pays des Grands Lacs, based at Gisenyi, Rwanda
CEPLANUT	Centre de Planification Nutritionnelle
CGIAR/GCRAI	Consultative Group for International Agricultural Research - Groupe Consultatif de la Recherche Agronomique Internationale
CIAT	International Center for Tropical Agriculture, Cali, Colombia
CIMMYT	International Maize and Wheat Improvement Center, Mexico
CIP	International Potato Center, based in Lima, Peru
CIRAD	Centre de Cooperation Internationale en Recherche Agronomique pour le Developpememt (France)
CODAIK	Comité de Développement Agro-Industriel du Kwilu (World Bank-GTZ project)
CORAF	Conférence des responsables de la recherche agricole Africains et Francais
CRAAL	Centre de Recherche Agro-alimentaire, Lubumbashi
CREN	Centre de Recherche et d'Etudes Nucleaires at UNIKIN, Kinshasa
CRI	Crops Research Institute, Kumasi, Ghana
CRM	Centre de Recherche sur le Mais of Gécamines Développement
DAIPN	Domaine Agro-Industriel du Président à Nsele (the agro-industrial domain of the President at Nsele)
DMPCC	Direction des Marchés, des Prix et des Crédits de Campagne, DOA
DOA	Department of Agriculture, The Zairian Ministry of Agriculture
DOP	Department of Plan, the Ministry of Planning
DOFBP	Département des Finances, Budget et Portefeuille
ECU	European Currency Unit: 1 ECU = ± $1.20
EEC	European Economic Commission
FAO	Food and Agriculture Organization of the United Nations
FSR	Farming Systems Research
FSR/E	Farming Systems Research and Extension
GECAMINES	Générale des Carrières et des Mines (General Quarry and Mining Company)
Global 2000	A private organization of Mr. SASAKAWA (Japan) and Mr. J. CARTER and Dr. N. BORLAUG
GOZ	Government of Zaire

IARCs	International Agricultural Research Centers of the CGIAR
IBRD	International Bank for Reconstruction and Development (World Bank)
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDA	International Development Association of the World Bank
IFA	Institut Facultaire d'Agronomie, Yangambi, Haut-Zaire
IFS	International Foundation for Science, Sweden
IITA	International Institute of Tropical Agriculture, Ibadan
INEAC	Institut National pour l'Etude Agronomique du Congo (National Institute for Agronomic Studies in the Congo)
INERA	Institut National pour l'Etude et la Recherche Agronomique (National Institute for Agronomic Studies and Research)
INIBAP	International Network for Research on Bananas and Plantains
INTSOY	International Soybean Organization, USA
IRA	Institut de Recherches Agronomiques, Cameroon
IRAZ	Institut de Recherches Agronomiques et Zoötechniques, based at Gitega, Burundi
ISNAR	International Service for National Agricultural Research
LOP	Life of Project
NARS	National Agricultural Research Systems
NCRE	National Cereals Research and Extension project, IRA, Cameroon
NGO	Non-Governmental Organization
PACD	Project Activity Completion Date
PCS	Project Central Shaba, supported by USAID (105)
PIO/C	Project Implementation Order/Commodities
PIO/P	Project Implementation Order/Personnel
PIO/T	Project Implementation Order/Technical
P.L. 480	Public Law 480, Food Aid from USAID
PNL	Programme National Légumineuses (RAV)
PNM	Programme National Mais (RAV)
PNR	Programme National Riz (INERA)
PNS	Projet Nord Shaba, which was suppported by USAID
PP	Project Paper
PRESU	Projet de l'Enseignement Supérieur et Universitaire, World Bank
PROCAR	Projet Production et Commercialisation Agricole Régionale in Bandundu region (102) - USAID
PRONAM	Programme National Manioc (RAV)
PSA	Procurement Services Agent
PVO	Private Voluntary Organization
RAV	Projet de Recherche Agronomique Appliquée et Vulgarisation

SACCAR	Southern Africa Coordination Council on Agricultural Research
SAFGRAD	Semi-Arid Food Grains Research and Development
SEP	Service d'Etudes et Planification at the DOA
TA	Technical Assistance
UNDP	United National Development Program
UNIKIN	University of Kinshasa
UNTZA	Union Nationale des Travailleurs Zairois (the National Zairian Labor Union)
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

1. Project Purpose

Project 660-091 is entitled "Applied Agricultural Research and Outreach". According to p.9 of the Project Paper (PP) it has two purposes: (i) to enhance the ability of the Department of Agriculture to do applied agricultural research and to transfer agricultural technology to increase village cultivators' food crop production; and (ii) to strengthen institutional capacities to conduct agricultural research and support outreach programs.

2. Evaluation Purpose

The purpose of this threshold decision evaluation of Project 091 is succinctly stated in USAID Kinshasa's scope of work:

"This second and final project evaluation constitutes a threshold decision evaluation and will provide guidance for the design of the follow-on project. Its purpose is to examine how and to what extent the delivery of project inputs is leading to the achievement of desired outputs; and, whether the outputs are contributing to the progressive attainment of the project's goals and purposes. In addition, it will explore prerequisites to the sustainability of project strategy, activities, and outputs".

3. Methodology

A contract team of four specialists conducted the evaluation between 14 November and 17 December 1988. The team was comprised of an agricultural research institution/management specialist who also served as team leader; an agricultural policy specialist; a farming systems research/extension specialist; and a plant breeder. Each team member was asked to prepare an evaluation report on the subject matter of his speciality.

The team met with many USAID and GOZ representatives responsible for the management of the project and visited research operations of the cassava, maize and grain legumes national research programs at M'vuazi in Bas Zaire, Lubumbashi in Shaba, Gandajika in Kasai Oriental and Kiyaka in Bandundu as well as the agricultural extension activity of USAID Project 105 at Niembo in Shaba. The Team's draft reports were discussed in Kinshasa with GOZ and USAID officials.

4. Primary Findings

A. Crop improvement research has made excellent progress. Several improved varieties have been released during the life of the project. For example over 10,000 kg of maize seed of PNM varieties were distributed each year in 1986-88 and an average of 245,000 meters of cassava cuttings per year in the same period. Given the paucity of reliable data this probably considerably understates adoption and acceptance. More will be introduced in the immediate future. The prospects are promising over the next five years for introduction of new and improved varieties.

B. A national food crops research institution for cassava, maize and grain legumes is in place and functioning. The learning process with respect to the effective operation of management systems is underway. A consolidated budget taking into account all revenue sources should be introduced.

C. Training of Zairian personnel under the project will be completed by the PACD. The synchronization with technical assistance has not occured. The concept and quality of the training program are good.

D. While Farming Systems research (FSR) and outreach under the project are underway, the accomplishment falls short of the project's expectation. The former is viable in two programs; the latter in only one. Integration of both of these components with crop improvement research has not occured across the span of the three National Programs.

E. Technical assistance provided by the International Institute of Tropical Agriculture (IITA) has been uneven. It is adversely affected by IITA's weakness in leadership and quality of staff. Leadership of the IITA team should be changed.

F. The lack of vehicles, equipment and supplies is the major handicap to realizing project objectives. Lack of transport for on-farm trials, village level studies etc. seriously hampers FSR, outreach and crop research.

G. The project suffers from a shortage of local currency resources required to meet project objectives. In real terms local currency resources in 1988 are less than two-thirds of what were provided in 1985.

H. The project is totally dependent on USAID for financing of local costs. Absent this, RAV would collapse. No

current prospect exists that the program can become self-sustaining in the next five years.

I. The continuation of three national programs should not be regarded as an immutable fact. Reduction in the number of programs and reappraisal of the location of their major research bases is in order.

J. About two-thirds of the research on cassava, maize and groundnuts from M'vuazi in Bas Zaire should be transferred to Bandundu.

K. While some mechanisms are in place for orderly programming and budgeting a much more effective research program can be brought into being if a strategic plan implemented by medium term plans of program and budget are adopted.

L. The building of sustainable institutions is a slow evolutionary, step-by-step process, with no short cuts, which will be very costly. The best scenario which could develop is one where a pragmatic diversion of labor makes INERA concentrate on cash and export crops and animal husbandry while RAV continues research on food crops. If this materializes, unification of RAV and INERA is possible in a time frame of 5 to 10 years. Prerequisites are that all of RAV's personnel is brought sous-statut with INERA salary scales. If in addition, INERA can be brought under the tutelle of the DOA, unification and increased donor support will be made easier.

5. Major Constraints and Recommendations for the Remaining Life of the Project

A. The most important constraint handicapping the project objectives is the lack of vehicles, equipment and supplies. The Evaluation Team strongly recommends that USAID, the responsible agency, turn over responsibility for their procurement to IITA. A fallback recommendation would be to ask REDSO W/CA for help.

B. Even if certain aspects of RAV management improve, with better cost management, the Team considers the lack of local currency resources is a major constraint. The Evaluation Team strongly recommends USAID and the GOZ jointly examine this problem and conclude what can reasonably be provided by way of local currency support during this period. If analysis shows there will still be a significant shortfall, a decision should be made to adjust the substance of the project.

C. IITA's performance is a major constraint to realizing project objectives. The Evaluation Team strongly recommends (i) USAID, GOZ and IITA consult to determine what role(s) IITA should play from now to the PACD; and (ii) IITA replace the existing leadership with a senior member of IITA's permanent Nigeria staff, with a track record of demonstrated leadership and management capacities.

D. A major constraint is the lack of integration of FSR and outreach with crop improvement research. The Evaluation Team strongly recommends RAV/IITA take decisive action during the remaining life of the project to bring about integration.

E. The existence of PNM is threatened by its shaky hold on its facilities at Kisanga. The Evaluation Team strongly recommends the GOZ/USAID act to reestablish PNM on a secure footing at that location.

F. The three National Programs should be reduced to two - cassava and maize.

6. Funds for construction/rehabilitation for Gandajika, Kiyaka and Kanyameshi should be frozen pending completion of site selection studies for major research bases for the remaining two programs.

7. <u>Lessons Learned</u>

1. Project objectives should be internally consistent in the project design. This project suffers from having three distinct objectives which have the effect within USAID of a lack of consensus on what the project and its implementaters are supposed to do.

2. USAID should avoid detailed involvement in project management and administration. To the greatest extent possible responsibility should rest with a single entity, preferably the host government. Nevertheless, USAID must keep abreast of major issues in project execution .

3. International agricultural research centers should be retained only with a clear and precise understanding of what they are best qualified to do. IITA as an institution offers no comparative advantage in management and outreach.

4. Integration of FSR and outreach with crop improvement research requires (a) agreement on what FSR is and (b) an extended learning process. Several concepts exist.

From the outset of project design through implementation there must be agreement on what FSR is.

5. Research built around a strategic plan and a medium term plan of program and offers the best prospect for cost-effective objectives-oriented research with built-in institution building.

8. Preparation for Follow-On Project Design

1. USAID should continue to support food crop agricultural research. No additional crops merit inclusion in RAV for a follow-on project.

2. The design should have as its centerpiece development of a strategic plan of research objectives translated into medium term, say five year plans of program and budget. In this process generally accepted formulae and criteria should be used for costing out personnel, operating and overhead costs broken down into F/X and L/C.

3. The question of whether there should be three or two national programs should be resolved. The Evaluation Team has recommended the number be reduced to two.

4. A site selection survey should be undertaken to make recommendations for location of National Program ;ajor research bases. Appropriate preliminary design and cost estimates ought to be prepared. Discussion with World Bank and/or other donors about possibility of non-US financing of facilities is recommended.

5. In the long term, the most important contribution which RAV will make for agricultural research in Zaire is human capital formation. RAV must make a determined effort in a follow-on phase to retain a core of Zairian scientific staff (MSc and PhD). At least 12 participants should be sent for training in the USA for MSc and PhD degrees in a follow-on project. More attention needs to be given to improving management skills of RAV staff.

6. In addition to short term visiting scientists from IITA, resident external assistance from IITA is still recommended, although at a reduced level, in support of returning trainees at PRONAM (3 positions) and PNM (2 positions).

7. A scope of work should be prepared for a study of sustainability of food crops agricultural research with target of putting any approved scheme into effect by the end of the follow-on phase.

EVALUATION REPORT

1. Project History

The six year Applied Agricultural Research and Outreach Project was authorized on September 7, 1983 with a Life of Project LOP funding of $10 million in USAID Grant funds. PACD was set for September 30, 1989. In addition, a GOZ contribution of counterpart funds equivalent to $13.654 million was funded for local currency costs. The Project Grant Agreement with GOZ was signed on September 13, 1983. This Project was conceived as a first phase of a 10 year effort (1983-1993) divided into two phases of six and four years.

Project implementation began in 1985 with the arrival of the Technical Assistance (TA) contract team. IITA was chosen to provide TA. The Cooperative Agreement between USAID and IITA became effective on 29 July, 1985.

An implementation evaluation was conducted in September 1986, a year after project implementation began. The main concern of the 1986 evaluation was "emerging problems and to ensure that the programming was on target to achieve USAID (project) objectives". See Annex 1, USAID statement on current status of implementation of this evaluation.

The Project Paper (PP) was amended as was the Project Agreement in June 1987 to increase the LOP funding by US$5 million for a total LOP of US$15 million. These additional funds were required to extend the cooperative grant agreement with IITA from July 1988 through the PACD September 1989 (now September 30, 1990); fully fund the 35 long term trainees in the U.S.; and increase the funding for the procurement of vehicles and equipment.

2. Purpose and Scope of Evaluation

This evaluation is to constitute a "threshold decision evaluation" and to "provide guidance for the design of the follow-on project". The Scope of Work (Annex 2) requires the submission of an Executive Summary, this report and reports prepared by Evaluation Team members on the following major topics:

A. Project Management and Administration: GOZ capacity to manage the national food crops research program in integrating research and outreach elements to the end of dissemination of results to farmers; GOZ supporting management systems; project strategies; the quality and content of management and technical assistance; size and capacity of Zairian staff; and USAID

oversight. These questions are the subject of the management specialist's Project Management and Administration report. (See Annex 3). Several personnel issues are also discussed in the Institution Building Report.

B. Farming System Research and Outreach Component: understanding, acceptance and adoption of FSR; integration of FSR with crop improvement research and outreach; performance of FSR; effectiveness and character of contribution of FSR and outreach to meeting project goals and purposes. The specialists' reports on Technical Issues, FSR and Outreach/Extension assess these concerns. (See Annexes 4, 5, and 6).

C. Institution Building: progress toward integration of all GOZ agricultural research; linkages between RAV and other institutions on agricultural development projects; assessment of training; sustainability. The specialist's reports on Institution Building and Training deal with these issues. (See Annexes 7 and 8).

D. Technical Issues: breeding program; insecticides; commercial sale of production; crop rotation; soil fertility practice and water utilization at the station level. The specialist's report on Technical Issues is Annex 4.

3. Report Format

A. This report integrates the specialists' statements of contraints and refines and restates their recommendations on a project wide basis. Major constraints and strong recommendations have been excerpted from their reports and the body of the report for inclusion in the Executive Summary. Many of the recommendations made in this report are intended to help in designing a follow-on phase to Project 091. The specialists reports also make suggestions for consideration by the GOZ and USAID which are not repeated in this report.

4. Project Objectives and Overall Performance

The present PP and the history of Project 091 show there have been distinct and perhaps diverse objectives. These are not necessarily inconsistent but because of their different perspectives they do affect how the project's sponsors and implementers look at it and conclude whether it has succeeded, failed, or simply underperformed.

A. First is a "results" oriented one centered on crop improvement. The questions asked are: how many new or improved varieties have been developed under the project; how many farmers have adopted the

varieties etc? In this approach attention is riveted on end results, not on the means to get there.

This concept finds expression in the PP, first on p.10 with the statement "crop improvement and production improvement research is the cornerstone of programs for improving theoretical production efficiency and output" and further on pp.11-14 when it describes the project components. Genetic crop improvement appears first and organization last. The 1987 PP Amendment on p.4 states "success of the project will be measured by the development and usage by small farmers of new genetic material, cultivars and seeds."

Project 091 has a record of substantial progress in crop improvement research as summarized in section 6 of this report and discussed in detail in the Technical Issues report. In the next five years more results will come based on the experience and knowledge gained and results obtained during the present phase.

B. A second set of objectives concentrates on "process", the how, in terms of specific tasks to be done, the research program should be carried out. The "process" objective stamp is seen most clearly in the narrative in the PP on the requirement to integrate crop improvement activity with Farming Systems Research (FSR) and outreach. The importance of this process objective is emphasized again in the scope of work for this evaluation requiring specific reporting on FSR/outreach. The Evaluation Team has examined closely the performance of the FSR and outreach components, including their integration into the entire system of agricultural research. See the FSR Outreach and Technical Issues Reports.

Judged on this basis, the Evaluation Team finds performance has been mixed. FSR and outreach activitites exist in all three National Programs but only in PNL is there integration of FSR with crops research and nowhere of outreach.

C. The third objective of Project 091 is institution building. Of all the three sets of objectives, this one receives the heaviest emphasis in the Project 091 documents, beginning with the PP, continuing with the PP amendment and coming down to the scope of work for this evaluation. Institution building is centered on the creation of an integrated national food crops research organization with three National Programs in cassava, maize and grain legumes. Much attention and effort have been devoted to the mechanics of organizing, staffing and financing this effort.

The Evaluation Team has the impression USAID oversight has been primarily concerned with the institution building objective and considerably less so with the "results" and "process" objectives. In its concern with shortcomings in RAV and National Program management and the content and quality of project "management" by IITA, USAID may have overlooked the fact that RAV and the National Programs are going organizations with at least the basic elements

of financial, administrative, personnel and supply management systems installed and accepted. It is true the National Programs, except for budgeting, operate these systems in a mechanical way and do not yet appear to have made use of them as effective management tools. However, this should come in time. More complex questions are the relationship between RAV and INERA, the emerging role of the World Bank, sustainability and overall organization and research location.

USAID concern with the institution building objective seems to have been focused on two issues. First, the constantly rising operating budgets of RAV and the National Programs coupled with the belief that personnel costs are out of line led USAID in July 1988 to direct a reduction of 240 in the total employment level of RAV and the National Programs. Second, USAID appears to believe that important management shortcomings are the result of inadequate performance by IITA. Both of these issues are treated in the Project Management and Administration Report; the Institution Building Report also discusses the first issue.

D. In summary the Evaluation Team's assessment of Project 091 performance in meeting these objectives is that:

(i) substantial progress has been made in meeting the results objective; the GOZ considers it has been a success.

(ii) the integration of FSR, outreach and crop improvement, i.e. the process objective, has not been achieved.

(iii) a sound foundation has been laid, looking toward realizing the institution building objective.

5. The Future: A Research Strategic Plan

The present arrangements for preparation, review and approval of the National Programs' annual work plan are good in themselves but national food crops research lacks a strategic plan defining research objectives. The Evaluation Team believes the development of such a plan, translated into a medium term plan of program and budget would provide a systematic means for comprehensive, integrated research planning and programming, including personnel, financial and material requirements. Specific projects and/or programs would be framed, detailing the resources - human, material and financial required to carry out the medium term program of objectives - driven research. This system is the one now in effect in the IARCs and it is workable.

The Evaluation Team recommends that (i) work start on developing and adopting this objective oriented framework; and (ii) this concept be the centerpiece of the design of any follow-on phase. See the Project Management and Administration Report, pp 10-13.

6. Technical Issues: Crop Improvement Research

A. Very useful crop or commodity-oriented agricultural research is being carried out in all three RAV programs. Several improved varieties have been released and further progress can be expected along this line since still better varieties are being developed for release in the immediate future (Table 1). See also Annex 9 "Importance of RAV crops" and Annex 10, "Importance of other major food staples". Commodity-oriented research is being carried out at satisfactory level. Basically, most researchers, local and expatriate, have their own research programs they run well with the limited means available to them. Although much needed, improved cultural practices for most RAV crops are not yet available to the farmers. Besides the quantifiable type of outputs presented in the project paper, there is definitely a need to include improved farming systems as attainable project outputs. Understanding of the farming system research concept, approach and methodology is generally very poor among project personnel.

B. The present organization of the programs is inadequate for the attainment of output 1 of the PP in particular, namely a coordinated and integrated food crop applied research program with forward and backward linkages to extension and the farmer through the use of FSR approach. The already limited project research personnel staff is spread too thin. Consequently, the basic disciplines nucleus needed for effective FSR/E does not yet exist at any of the three programs. Improvement is urgently needed.

C. The geographical spread of a project with limited means has caused numerous problems of communications, unnecessary duplications in efforts to provide each program with adequate facilities, equipment and personnel and has deprived the researchers of much needed technical or scientific interactions. This question is examined in section 7.

D. In this context, the Evaluation Team recommends that the next two years be used to prepare for phase II of the project. The actions suggested below will help improve project performance in the remaining two years as well as lay the ground work for the next phase.

(1) Make an exhaustive inventory of on-the-shelf technologies and screen those under farmers conditions

(2) Develop a detailed research program and work plans to implement the approved research strategy during the remaining two years of the project.

(3) Strengthen the training of research personnel in the concept of farming systems approach to research so that all those concerned have the same view of what is going to be done in the implementation of this project.

(4) Strengthen the agronomic research component in all the three programs to focusing on soil fertility, intercropping and cultural practices.

7. Overall Organization and Location

In the Team members' reports, the physical isolation of PNL at Gandajika is mentioned; the tenuous hold of PNM on facilities in and around Lubumbashi is noted; and in its visit the Team was struck by the bad access road to Kiyaka. The Evaluation Team understand funds are available or being programmed for construction and rehabilitation: (i) of PNM's farm at Kaniameshi, 27km from Lubumbashi as well as reconversion of space under consideration for lease in Lubumbashi to provide temporary accommodation for PNM; (ii) at Gandajika; and (iii) Kiyaka. If carried through these projects would fix in "concrete" (a) PNM's eviction from Kisanga and the utilization of Kaniameshi; (b) Gandajika's isolation and its continued location as PNL's headquarters'; and (c) Kiyaka's status as the only station in Bandundu.

These plans and their consequences raise two separate but intertwined issues. First, should the present organizational alignment of the food crops research program be continued in the future? Second, what should be the geographic distribution and thrust of the National Programs major research bases?

The Team members' Project Management, Technical Issues, FSR and Outreach reports all highlight from different perspectives the managerial and location problems resulting from having three national programs in operation. Cassava and maize are major crops but not everywhere in Zaire. One or more of the grain legumes are often grown in association with cassava and/or maize. The Team concludes from its examination that consideration should be given to examining whether having two national crop programs - maize and cassava based with legumes research integrated into these two programs would be more conducive to successful food crops research than the present organizational arrangement. Therefore the Team recommends the restructuring of the three national programs into two and that this be analyzed in any follow-on project design.

Bound up with the question of the appropriate organizational structure is the issue of geographic emphasis and location. The Evaluation Team believes the national programs should have their major research bases located in areas which are the principal production sources of the crops in Zaire. The statistics

demonstrate that for cassava this should be Bandundu and for maize, Shaba. In this connection, refer to Annex 11: "The need to increase food crops research in Bandundu region".

In each case, the selection of a location should be made in accordance with generally accepted criteria for site selection of major research bases, in addition to the one just mentioned. The major research base should have suitable land for conducting experiments; have good and dependable transport and communication links to the rest of Zaire; and be situated in or near communities of sufficient size and attraction to staff, with reliable, dependable utility services, vehicle and equipment maintenance and repair facilities, available family housing, community facilities etc. Without intending to prejudge the results of a comprehensive site selection study, the Team recommends that funds now available and/or budgeted for 1989 for construction at Kaniameshi, Gandajika and Kiyaka be frozen. With respect to PNM specifically, the Team calls attention to a current near-crisis and strongly recommends USAID and the GOZ to act urgently to make Kisanga a viable major research base. The Team considers, based on its observation, that Kisanga would probably meet appropriate selection criteria if PNM were adequately housed there and enough suitable land was assigned to PNM. This would obviate the need to develop Kaniameshi, which may now have a major industrial pollution problem as outlined in Annex 12. "The PNM as the planned move to the Kanyameshi farm". PNM's sustainability is also threatened by the creation of a new national research center to be located at PNM's headquarters at Kisanga. See Annex 13.

Looking forward to a follow-on phase, the Evaluation Team recommends that the project design incorporate provision for a comprehensive site selection study along the lines outlines above and deal with the question of timing and financing for capital investment in new facilities for the food crops research program. This might also be a useful question for discussion with the World Bank in view of its reported interest in the rehabilitation of seven INERA research stations.

8. Integration of FSR/Outreach with Crop research

A. Farming Systems Research

FSR in the Applied Agricultural Research and Outreach project has not had the impact on research that was hoped for in the Project Paper. One reason may be that RAV, in association with IITA, decided to outline its own program of FSR. Although slightly different the approach is still a valid one. The RAV approach was presented in a paper by Dr. Lutaladio of RAV at the FSR seminar held in Lubumbashi from January 19-31, 1987. FSR has not been integrated well into either PRONAM or PNM but has been employed at

PNL. Researchers concerned with crop improvement should have been involved at appropriate stages including on-farm trials. Further, PRONAM and PNM were on-going research programs before RAV's involvement and had previously set research priorities, making it difficult to integrate FSR derived research agenda into the existing program. Researchers felt they already knew farmers' production constraints. The multi-disciplinary research approach is not apparent in either M'vuazi or Kisanga. PNL has made more progress than the other two programs in identifying farmers' constraints and tailoring research and on-farm trials to address those constraints.

All programs have been working under various constraints. A constant lack of vehicles and operating funds since 1986 has plagued the project at every level. Qualified personnel are reported to be planning to leave the project due to frustration and lack of resources. Access to scientific equipment, journals and other publications has hampered research progress. Gandajika's isolation adds family stress to the problems facing scientists in the other two programs.

Lack of cohesive FSR and outreach activities and their integration with the commodity improvement programs have been a major weakness of the RAV project. Feedback relating to the performance of technologies based on on-farm research and outreach activities has been spotty at best. Similarly economic evaluation of technologies in terms of their impact on production and income and its effects on other parts of the production systems has been neglected. It is felt that FSR and outreach activities should complement each other if they are to become effective units of the National Programs.

The Evaluation Team recommends that

1. RAV should combine FSR and outreach sections into one section, redesignated as FSR-Outreach. It should be staffed by an agronomist, an economist and an outreach specialist. A rural sociologist should be added as soon as a qualified candidate becomes available.

2. RAV should clearly define the basic functions of the FSR-Outreach section and its relationship with the crop improvement section:

   a. identifying production constraints and improvement opportunities through surveys
   b. evaluation of technologies both on-station and on-farm
   c. outreach activities including monitoring and feedback
   d. impact assessment.

3. Regular interactions between crop improvement sections and FSR-Outreach sections should be ensured by regular meetings and monitored by the Program Directors.

4. On-farm tests conducted by RAV should be concentrated in selected representative villages of the major farming systems for better management and supervision.

5. A short-term consultant in agricultural economics should be provided for six weeks to work with the FSR-Outreach sections of the National Programs to plan and develop technology impact studies. Linkage with projects conducting socio-economic studies will greatly benefit RAV in the impact assessment activities.

6. Follow-on project design should review the working of the technology evaluation and transfer section and suggest improvements needed.

B. Outreach

Outreach in the Zaire Applied Agricultural Research project has been weak with a few notable exceptions. Little institution building has taken place. Ties with collaborating organizations are still weak; technical publications for extension are inadequate; and qualified personnel are lacking. The amount of improved seeds and cassava cuttings distributed is, however, impressive. This implies that research has done a good job of developing better varieties. A good product will sell itself. It will sell much faster in a country with poor infrastructure, and communications, if an effective outreach program is actively pushing it.

The arrival of the latest outreach specialist in M'Vuazi will ensure that PRONAM's efforts in Bas-Zaire will continue to be on the right track. Further work in strengthening formal ties to collaborators, training and information need to be accomplished. PRONAM's work in the Bandundu region is also to be commended although even more informal than in Bas-Zaire. PRONAM did an excellent job of distributing one improved variety in Zaire's most important commercial cassava producing area. PNL's work with Peace Corps Volunteers in the Gandajika area should also be mentioned, where over 200 demonstration plots with contact farmers were established.

PNM had no outreach section until late 1987 when it was staffed by an agronomist (Ao level) drawn from the FSR section of PRONAM. However, there has been a significant demand for maize varieties by the development projects (PNS, PCS) and NGO organizations. Recent arrangements whereby PNM will be collaborating with PCS on promotion of maize are encouraging.

Until the PACD, the Evaluation Team recommends outreach should work on developing better linkages with collaborating organizations and strengthening the staff of collaborating organizations, through training and provision of information materials. Outreach and FSR should be merged and outreach take on the responsibility for feedback on varieties tested on-farm and promoted through outreach efforts. Despite the problems that outreach has experienced it can be turned around quickly if the right emphasis is given to this activity.

The Evaluation Team recommends that:

1. All vacant positions in the outreach sections be filled immediately with qualified personnel.

2. At least one more A0 level candidate should be sent for M.S. level training and extension.

3. Outreach activitivies in all the three national programs should be strengthened systematically: formal linkages, clear definition of roles of the national programs vis-a-vis the collaborating organizations, and feedback mechanism etc.

4. Immediate steps should be taken to produce information material on new varieties/technologies available through the national programs.

5. Short term technical assistance in outreach be provided to PNM and PNL programs to provide advice on systematic organization of outreach activities.

6. A follow-on project should concentrate on strengthening an outreach program with training and technical publications/advice and feedback as the two most important elements. Improved varieties should be provided for on-farm testing and initial promotion efforts.

9. Project Management and Administration

A. Framework

The framework of project 091 project management and administratin appears in the section of the Project paper entitled "End of Project Status" on pp 20-21 outlining "significant accomplishments" to be attained by the end of the project. These are: (a) a trained cadre of Zairian research personnel in place; (b) an in-being and effective organization capable of directing and managing food crop research in the country; (c) FSR installed and operating; and (d)

integration of crops research, FSR and outreach/extension leading to research activities more relevant to the farmer (these two subjects are considered in depth in the specialist's FSR and Outreach Reports).

B. Inputs

These accomplishments are to be made possible by USAID-financed inputs of (i) training; (ii) external assistance provided by IITA; (iii) organizational, personnel and operating costs of a new Zairian food crops research structure consisting of a central coordinating office (RAV) and three national research programs for cassava, maize and grain legumes; (iv) procurement of vehicles, equipment and other material to enable the program to operate effectively; and (v) the creation of a soil mapping unit and the conduct of a soils survey.

Because training and IITA's role merit particular attention, sections 10 and 11 of this report are devoted to these two activities.

C. Management

(1) AID financing has resulted in the creation of an operational GOZ coordinating group in Kinshasa and the adequate functioning of three national food crops research programs. Management systems introduced under the project are in place and functioning. See pp 4-11 of the specialist's Project Management and Administrative Report and Annex 14 "RAV Organization".

(2) Finance. The entire effort is totally dependent on USAID financing of all foreign exchange costs and the bulk of recurrent and capital local costs. See Annex 15. Counterpart fund generations are the source of AID's local cost financing. The amount of these funds varies from year to year and there are other competitors for them. While RAV's and the National Programs' management of these funds is less than optimum, nevertheless it is probably still true that the level of counterpart fund support is significantly short of what is required to field an adequate food crops research program. See Annex 16 on the impact of inflation. In this connection it is ironic that if all the National Programs were satisfactorily equipped and housed, operating budgets would have to be increased. This is a major constraint to attaining project objectives. Local cost financing is central to the sustainability of the program, discussed in the Institution Building Report. In the short run, it is strongly recommended that the GOZ and USAID examine in depth and reach an understanding on

the amount of counterpart fund support required during the remaining life of Project 091 to finance it adequately. It is recommended the matter be thoroughly analyzed as part of the project design of any follow-on project.

Because of rapid inflation the amounts budgeted for a National Program early in the year funds begin to fall short of the amounts required to finance approved line items and constant adjustments have to be made in line items. The management of funds is made more difficult by the reported policy of USAID not to allow National Programs to include an inflation factor in their budgeting. To deal with this problem, it is suggested that USAID and RAV agree on an inflation factor before budgets are prepared to be used in budgeting for the following year.

The National Programs have no control over foreign exchange resources. They prepare their budget requests without knowing whether an item is to be financed by local currency or foreign exchange. The budgets they submit are strictly those to be financed with counterpart funds.

The National Programs do have other sources of funds. First, the GOZ allocates Budget Ordinaire or Budget d'Investissement funds to RAV and the National Programs. See Annex 15. One of the National Programs may budget for these funds but it appears at least one other does not. Second, another source of income is sales of production and foundation seed. Third, the Programs appear to earn interest on bank accounts. Revenues from these sources do not enter into the budget submitted to USAID.

In order to bring into being a complete, integrated financial management system, the budget should be expanded to include the financial resources represented by these non-counterpart fund revenues. The costs of sous-statut personnel might usefully be included as well, so that managers would have available in systematic fashion an authoritative statement of all the funds flowing to the National Programs for expenditure. Logically foreign exchange requirements should be included in the budget if they are not already included. Accordingly, the Evaluation Team recommends that a comprehensive budgeting system be installed covering all local currency resources and costs and, if feasible, foreign exchange flows. Further, and it is understood this is under consideration, it is suggested that annual budgets be divided into operating and capital budgets and a definition of "capital" be adopted.

While some external audits have been performed, the Evaluation Team recommends that an external auditor be retained as to make annual financial, and if feasible, management audits of each National Program and RAV. This would serve as an incentive and goad to financial and management efficiency.

Financial, supply and vehicle management systems are in place or in the process of being implemented. While these systems are sound in conception, their administration is in the early stages of development, particularly the management of fuel and supplies, including spare parts. The stores of two of the three National Programs leave a great deal to be desired in terms of orderliness and arrangement of stocks.

(3) Personnel

(a) Two major groups of GOZ government employees work on the project. The first, designated "sous-statut", are permanent staff with tenure. They are incorporated in the "Fonction Publique" of the GOZ and paid out of a central government budget. In the case of the relatively few "sous-statut" employees working under Project 091, the basic salaries are paid directly by the GOZ and accordingly are not budgeted for in the counterpart fund budget. However, USAID does pay "primes" of this group and they are included in that budget. The great bulk of the staff employed by RAV and the National Program are recruited on a contract basis and are known as "sous-contrat" employees of the GOZ. Their salaries, salary categories and qualifications are the same established for sous-statut employees. USAID pays their base salaries and "primes". All other associated personnel costs, e.g. medical care, are financed out of the counterpart budget. In both cases, the base salaries are lower than those paid by INERA, the national agricultural research institution. If these salaries were raised to thoses of INERA and all employees were given sous-statut status, it is possible savings of 30% could be achieved in personnel costs. The Evaluation Team recommends USAID negotiate with the GOZ to realize this objective. See the specialist's Institution Building report for a further discussion of this problem.

(b) USAID has been concerned with what it considers to be excessive staffing levels. The following table shows the percentage of total counterpart fund budget represented by personnel costs for each of the National Programs and RAV Coordination.

PERCENTAGE OF OPERATING FUNDS ALLOCATED TO PERSONNEL EXPENSES

	1986	1987	1988*	1989**
COORDINATION	10%	19%	17%	18%
PRONAM	26%	67%	72%	48%
PNM	17%	50%	53%	44%
PNL	14%	51%	62%	48%

* As of third quarter
** As budgeted

Personnel staff levels vary considerably among the Programs. For example, PRONAM is not more important nor its program inherently more complex than those of the other two but its staff is much larger as is its counterpart budget. This may be justified but RAV and the Programs need to have criteria for determining staff levels and composition. If RAV and the National Programs move to an objectives based research effort as recommended in section 3 of this report, a sounder base will exist to plan and establish staffing levels.

One generally used yardstick applied in agricultural research is that personnel costs should not exceed 55-60% of total current operating costs. As this table demonstrates two Programs' level of personnel expenditure for this object have at times exceeeded this measure of cost evaluation. This is clearly the reason why USAID in July 1988 directed that the total staff level be reduced by 240. This reduction has not yet been put into effect.A complementary guideline is that other operating costs should be at least $10,000 per researcher.

Elsewhere in this report, concern is expressed about the manner in which this was done. In any event, looking forward to 1989, as the table forecasts, this situation is being corrected. In the future, the utilization of formulae such as the ones indicated above to arrive at a standard for proper staffing levels and operating costs would be helpful in avoiding the problem encountered this year.

The Evaluation Team recommends that in the future USAID and RAV/IITA work cooperatively on criteria and formulae to construct personnel and operational budgets. Looking toward a follow-on phase, the Evaluation Team recommends the question of staffing be integrated into the project design. This is discussed in section 5 of this report.

(4) Vehicle Management

The vehicle fleet is critical to the efficient operation of the National Programs. Largely because of the failure to receive timely delivery of new vehicles and spare parts, none of them has anything approaching a vehicle inventory in satisfactory operating condition. Each National Program maintains and repairs its own vehicles and farm equipment in very simple facilities. The situation at PNM is particularly bad. Since it is located near a large city, the Evaluation Team suggests that PNM explore the feasibility of commercial vehicle maintenance and repair. PNM's reported present position is this would "cost too much" but the Team did not see any cost analysis supporting this conclusion.

The lack of vehicles and vehicle spare parts has been almost crippling to the National Programs. The vehicles are needed for on-farm trials, village level surveys, demonstration trials, contacts with extension organizations etc. The deficiency in

vehicle availability is the most serious major constraint observed by the Evaluation Team affecting project performance. The situation demands top level USAID attention. It is strongly recommended that the present arrangements be overhauled at the earliest possible moment with a view to turning over to IITA responsibility for procurement of all items not covered by an outstanding purchase order, with IITA/RAV/USAID agreeing on an illustrative list of items to be purchased. USAID has informally advised the Evaluation Team that such a changeover would require six months to a year in administrative processing (amendent of IITA agreement etc) to accomplish. A fallback recommendation would be to ask REDSO C/WA to help out.

D. USAID Oversight

USAID has not only exercised oversight of Project 091, it has gradually expanded its role to encompass co-management of the project in critical respects. The foundation is the project design which reserved to USAID (i) management and administration of procurement; (ii) and execution of important parts of the training program. In addition, USAID has used the power of the purse to direct RAV to reduce national staffing and by a specific number.

What has evolved is a kind of micro-management embodied in the position of the Project 091 project officer (the PP states a second officer was to be appointed to handle technical oversight but this does not appear to have been done). It is noted that in three years there have been three project officers, each with a distinctive approach to the job. USAID management appears to have allowed oversight to become essentially a partnership with RAV and IITA in the administration of details in project implementation.

At the same time USAID management at the level of the ARD officer and above does not appear to have been very active in following the substance of crop research, FSR and outreach and other major problems which have arisen. While USAID was represented at the August 1988 Lubumbashi scientific review, visits to the National Programs at the USAID management level are relatively sparse (see Annex 17). No one from USAID has been to PNL at Gandajika in over two years. Whether because of this or other reasons, major problems such as the shaky hold of PNM on facilities at Lubumbashi; the implications of the major handicaps faced in operating at Gandajika; the slow progress toward integration of FSR and outreach with crop improvement research; and the fateful consequences of the paralysis in procurement seem not to have engaged the sustained attention of USAID management.

What the sum and substance of all these actions add up to is that USAID has become active partner in the detailed administration of Project 091 along with RAV and IITA. This shared responsibility means authority for project management are diffused as well, with the unfortunate consequences described above. The Evaluation Team

recommends USAID make a systematic evaluation of the role it is now playing, decide what it wants to do in the future and who should do it. In any case USAID management must be more active in monitoring what is going on concerning the substance of and critical issues in the project and at the same time make sure the Mission avoids micro-management.

10. Training

35 participants are now actively pursuing MSc and PhD training in the USA, as planned in the project paper. This is a major effort in human capacity building which should be commended. However, the synchronization with technical assistance has not occurred. This is a constraint on meeting project objectives. The difficulty of finding qualified candidates reflects the weaknesses of the faculty of agriculture (IFA) at Yangambi. The World Bank is now addressing the problems at the faculty of agriculture in the framework of the PRESU project. The training of participants of A1 level will probably encounter major difficulties. It is to be expected that these candidates will require more than one additional year and that the failure rate will be higher. Attrition rates among returning participants appear fairly high, around 50%. Several reasons are discussed in the Training Report which may explain this attrition. The mechanism for the selection of candidates is clear and well established. The distribution of skills seems fairly well balanced. In the future, the Evaluation Team recommends more attention be given to improving management skills. The Evaluation Team also recommends that Zairian PhD candidates should choose and implement their dissertation research in close collaboration with IITA and RAV.

For any follow-on phase of the project, the Evaluation Team recommends that at least 12 participants be sent for training in the USA. The distribution of skills is discussed on p 4 of the Training Report. For a follow-on phase, the need for continuing external scientific resident support is foreseen, although at a reduced level from that of the first phase. The Evaluation Team recommends that in the design for a follow-on phase, provision be made for five resident scientists. (p 5, Training Report). A director of training should be appointed without delay. In a follow-on phase, major emphasis should still be put on training at all levels, including in-country training and training at the IARCs.

11. Technical Assistance

The PP, curiously in view of the important role IITA was to play, says relatively little about IITA other than to specify the disciplines of a projected 14 member team and to sketch in how some of the IITA staff would be distributed among the National Programs. At page six the PP says "The need for external asistance over an

extended period stems from [the fact that] ....(b) the newly trained personnel will need direction and technical and especially managerial support which only more experienced help can provide". The PP thus assumed the training program would get underway and be completed in time for the IITA team to support these returning trainees. This will not occur.

It is clear that IITA under its Cooperative Agreement with USAID was given a not altogether consistent set of tasks to perform. To some extent the Institute is to be director of the project; to some degree it shares responsibility for project management with RAV; and lastly it is to render technical assistance. The Chief of Party is to provide "professional technical and managerial counsel to the Zairian counterpart Project Coordinator; and thereby jointly implement the project". The IITA scientists may do, direct and/or advise on research. IITA is also to provide personnel for administrative assistance.

The mixture of managerial/administrative responsibility, technical direction and technical and administrative assistance has placed IITA in an awkward position, further complicated by the designation of an IITA scientist in each National Program as Principal Adviser (Conseiller Principal) to the Director of the Program. While this title speaks in terms of advice to be given, the Principal Adviser has in fact become the alter ego or deputy to the Director. Typically he co-signs with the Director all administrative notices.

As a consequence, it is understandable why USAID and perhaps the GOZ consider IITA to be co-manager of the project, except for procurement and important aspects of training, for which USAID is responsible.

This concept of IITA's role apparently was based on the assumption IITA is well equipped to provide managerial expertise to a national agricultural research program. This may be a misconception. Generally, the International Agricultural Research Centers (IARCs) carry on their own research programs; conduct research as partners in cooperative research programs with national agricultural research organizations (NARs); lead or participate in regional research networks; and provide training at their own facilities. Not so commonly do they undertake activities in which they are retained for managerial and administrative expertise or to serve as advisers. Nor do they generally work on outreach or extension directly. Their focus is on research programs.

Their participation in institution building are functions of (a) setting an example as to how research ought to be conducted; (b) being a partner in research programs; and (c) providing training at their facilities.

In any event, IITA has not brought to bear any comparative advantage in the management of the program overall. Certainly as

an IARC, its expertise does not lie in outreach or extension. Whether because of all of these factors and/or the difficulty of recruiting qualified people for long term residence in Zaire, the IITA team is of uneven quality and is particularly weak in managerial skills. None came to Zaire directly from prior service in Nigeria as members of IITA's permanent staff. IITA management in Ibadan seems not to have had Project 091 high on its list of operational priorities and therefore gave to its effort in Zaire what appears to be fitful attention.

Two vacancies exist and one or more members of the IITA complement are known to intend to leave in the near future. Given the short time remaining before the expiration of IITA's commitment, it is probably almost impossible for the Institute to recruit any further replacements.

The present distribution of IITA personnel is set forth in Annex 18. It is substantially different from what was contemplated in the PP. IITA specialists are dispersed among the National Programs. The positioning has been on the basis of filling positions to be taken up by qualified Zairois scientists upon their return from advanced training in the U.S., not to train these scientists. Thus the geographic distribution of IITA personnel and the intent stated in the PP about the relationship between the positioning of IITA staff and training are not consistent. One unfortunate consequence of the scattering of the IITA team is that they work primarily on the Program to which they are assigned. This is not a problem in the case of the breeders and to some extent the economists but it has meant the soils scientist and the entomologist have not made significant contributions to other than PRONAM or PNM respectively, where they are based. It is too early to tell whether the outreach specialist based at PRONAM will be able to assist PNL and PNM in a meaningful way. In sum because of geographic dispersal, the IITA staff does not constitute a well knit team.

Therefore, the overall performance of IITA has not been effective and consitutes a <u>major constraint</u> to meeting project objectives. IITA's input needs to be strengthened for the remaining life of the Cooperative Agreement. This requires more systematic attention by IITA top management. <u>The Evaluation Team strongly recommends</u> the Institute replace the present leadership of the team and post a senior member of the Ibadan permanent staff in Zaire to improve performance, someone with a proven track record in leadership and management. Further, the <u>Evaluation Team suggests</u> IITA and USAID/RAV for the remainnig life of the Agreement negotiate on the precise role to be played by IITA staff, including the phasing out of the PACD the Physical Plant Services and Vehicle Management positions. The role of technical assistance in any follow-on phase is discussed in the Training Report.

12. Institution Building: Agricultural Policy; RAV/INERA, World Bank

The stagnation and/or decline of the agricultural sector is well known and well documented in reports of the DOA. The liberalization measures of 1982/83 have put greater emphasis on the private sector and have encouraged commercial production of food in areas which are well integrated in the marketing system. Since the early 1980's, public agricultural sector expenditure has gone even down further, from about 3% of total expenditure in 1981-83 to less than 1% in 1984-86. However, public investment budgets in agriculture are increasing as part of the structural adjustment policies (Priority Investment Program, PIP).

SEP in the DOA is building up an analytical capacity for planning and policy making. However, there is a danger that projects are treated as a substitute for planning and policy.

The key to any successful long term agricultural sector policy making and planning lies in clearer procedures to allocate and to deliver timely and sufficient domestic resources to agriculture and in the acquisition of sufficient leverage in the DOA to increase the aggregate levels of allocations to agriculture. At present levels, very little is possible except the integration of donor supported projects into planning so that they can complement national level policy initiatives and provide useful experimental examples.

The relations between RAV and INERA are often strained. A convention signed in 1984 has led to an improvement in relations. INERA considers RAV as a discrete projet in the DOA and views itself as the national structure for agricultural research in the country, covering all crops and all regions.

RAV collaborates with many PVOs/NGOs and governmental organizations in its outreach/extension. RAV has preferential relations with other USAID-supported projects but has not always been able to respond to their research requests. There has been criticism about the quality of the foundation seed which RAV furnishes to seed farms. This is related to lack of facilities (procurement) at RAV for grading, seed testing and storage.

The World Bank's proposed national agricultural extension project (T&V) will increase demands for improved technologies at RAV. If possible, RAV should provide the subject matter specialists at full cost to the project.

In 1985, the GOZ approved the ISNAR study group's recommendations. Some progress has now been made on the implementatin of these recommendations, although follow up is very slow. The World Bank is now taking an active role in the coordination of donor support

for INERA's restructuring and in the drawing up of a long term master plan for agricultural research, with support from FAO/UNDP.

Unless clear and tight research priorities for INERA are set and adhered to which will keep the overall effort manageable, there is a real danger that organization, administration, logistics and infrastructure development will take precedence over applied and adaptive research. Substance and aims should determine organization, infrastructure development and financing of INERA, not vice versa.

The best scenario is one where a pragmatic division of labor leads INERA to research on cash crops, export crops and animal husbandry, whereby RAV continues research on the basic food crops including farming systems research and long term resource sustainability. If in addition, INERA can be brought under the tutelle of the DOA, unification of the two will be made all the more easy. In such an integration, the commodity based national programs can and should still maintain their autonomy.

In case the best scenario materializes, a time frame of 5 to 10 years will be necessary to carry out the needed adjustments and to integrate the national programs in INERA after that INERA itself has been profoundly reformed.

The key to the long term viability of agricultural research in Zaire lies in showing the GOZ that RAV's agricultural research and the dissemination/outreach of its findings is a vital component of accelerated economic growth in the economy.

13. Sustainability

RAV and the three food crop research programs would collapse tomorrow without foreign assistance. Presently USAID meets all foreign exhange costs and 98% of local costs. Even with more efficient financial management, the project is short of the resources to mount an effective program of food crop research. No reasonable prospect exists the GOZ will provide any more support in the future than in the past. If USAID terminates its support, RAV would become another INERA with even less chance to survive.

Various suggestions have been floated to make Zaire agricultural research financially viable: a tax on food imports funnelled directly to research or some other tax the proceeds of which would go to agricultural research; either National Program seed multiplication on a commercial scale or close association with present commercial seed producers; National Programs' contracting with seed producers etc. to do research. The Robert R. Nathan paper prepared for USAID has a number of interesting suggestions in this regard. The Institution Building Report reviews the sustainability issue in detail.

Good arguments can be made for saying none of these ideas will work. Nevertheless, the Evaluation Team recommends that an essential element of the project design of any follow-on phase should be the exploration in depth of these and any other ideas, with the intention that by the end of the next phase a realistic plan for financial sustainability be put in place. If this does not prove feasible, then USAID should consider a progressive reduction in its support for food crop research. In the search for solutions, USAID should work closely not only with the GOZ but also with other donors, particularly the World Bank.

If USAID concludes that during the next phase it cannot provide assistance on the required scale, particularly for the financing of local costs, it should determine in the process of project design how much local currency it can reasonably provide and cut the cloth of the program accordingly. At the present time, as discussed in the Project Management Report, paragraph K, p15-17, USAID seems to be engaged in financial micro-management in order to put a cap on its local currency cost exposure. While the Evaluation Team agrees some economies can be realized in this fashion, it also considers this splinters management responsibility between the GOZ and USAID.

LIST OF ANNEXES

22. Interdepartmental decree of December 10, 1985 creating "RAV"

23. RAV budget proposal for 1989

24. Budget ratios 1989, dated 5 December, 1988

25. Letter dated January 22, 1988 of Dr. Frank E. Brockman to Mr. Don Brown on the financial crisis at RAV

26. Project 660-0091. Expenditures per Fiscal Year, Memorandum

27. IITA Comments on progress towards goals listed in IITA/USAID Attachment 2, pp. 23-25 of Cooperative Agreement

28. IITA Comments on attainment of benchmarks set forth in IITA/USAID Cooperative Agreement, pp. 3-6

29. IITA Proposed benchmarks for period of extension of IITA/USAID Cooperative Agreement to September 30, 1990

30. Training: process for nomination; selection and liaison with USAID, USDA; participant trainees status; discipline distribution and list of trainees who went through IITA's Root and Tuber Improvement Program

31. Networking-Linkages

32. Programme de recherche manioc - INERA

33. Programme de recherche mais - INERA

34. Programme de recherche sur les legumineuses a graines - INERA

ANNEX 1

ACTIONS TAKEN TO COMPLY WITH 1986 EVALUATION RECOMMENDATIONS

Recommendation No. 1: Project will contract two consultants from CIAT and ICRISAT to facilitate a joint effort with their scientific staff and the two RAV-IITA economists to produce a new legume research priorities paper.

Action Taker: CIAT and ICRISAT did send two consultants to the project. They visited the project at separate times and therefore a consensus was not reached among CIAT, ICRISAT, and IITA. CIAT recommended planting more beans and ICRISAT recommended planting more peanuts.

Recommendation No. 2: PRONAM and PNM will set up simple farm level experiments with input from agronomists and economists for several of the development agencies utilizing their new cultivars. One half day should be reserved in the annual program review of each commodity for feedback on new technology performance from its clientele.

Action Taken: PRONAM and PNM are working with 54 different agencies which are conducting farm level experiments. Feedback from clientele has been included in the annual program review since the 86 evaluation.

Recommendation No. 3: USAID and the RAV/Coordination office will ensure that the FSR and Economic inputs are effectively incorporated into the PRONAM and PNM programs.

Action Taken: 1987 budget did incorporate FSR and Economic inputs.

Recommendation No. 4: PRONAM and PNM will document the sketchy information on the diffusion of their new cultivars. Once these field results are obtained and written up USAID should facilitate its communication so that different levels of the GOZ begin to appreciate the economic importance of agricultural research.

Action Taken: PRONAM and PNM have documented diffusion of their cultivars to the 54 agencies working with the project. This information was also passed along to the GOZ through the Department of Agriculture's SEP unit and the Director of Project's Office.

Recommendation No. 5: USAID and the RAV/Coordination unit will incorporate on-farm trials as a regular component of the breeding process.

Action Taken: On farm trials are taking place at all the stations.

Recommendation No. 6: USAID and IITA will contract the help of consultant services to investigate the need for developing research strategies in all three commodities for weed problems and in maize and legumes for storage insects.

Action Taken: A weed consultant came to visit the project. His recommendation to use herbicides could not be implemented because of agency procurement prohibition as well as lack of funds and distribution channels. Nothing was done concerning the storage insects.

Recommendation No. 7: USAID will find a mechanism to justify the combined undergraduate and graduate training of the RAV personnel with three year undergraduate degrees (A1).

Action Taken: USAID's Director signed an agreement to do consecutive bachelor/master's degrees.

Recommendation No. 8: The RAV/Coordinating office and the Program Directors will develop a planning document on the relationship of extension to the other phases of the RAV project.

Action Taken: Memorandums of Understanding have been written between RAV and the participating projects which describe responsibilities of the respective parties.

Recommendation No. 9: A priority construction investment to improve both morale and research efficiency is the provision of water and electricity in Gandajika.

Action Taken: Wells were drilled and the electrical system was repaired. The equivalent of approximately $1 million was budgeted for renovation of the station. An A&E firm has submitted a plan for the station's renovation. Further construction efforts will be contingent on this evaluation's recommendations.

Recommendation No. 10: RAV will establish project goals, strategies and research priorities.

Action Taken: Starting in 1987, annual scientific reviews were held for all the programs. These reviews included establishing goals, strategies and research priorities for the coming year.

Recommendation No. 11: A research program organizational structure will be presented by RAV/Coordination and the IITA Technical Advisor to the RAV Coordinating Council for approval.

Action Taken: An organizational structure was done and is currently being refined now to reflect position and employee occupying that position.

Recommendation No. 12: The Project Coordinator, Adjoint Technique, with the IITA technical adviser will initiate within the current cropping season an effort to build morale by providing more managerial assistance to each of the national program directors and their staffs through dialogue during continued frequent visits.

Action Taken: The Project Coordinator visits project sites about once a year. The Adjoint Technique goes out about twice a year. Mr. John Mitchell, the former USAID project monitor, thinks morale is much better now than it was at the time of the 86 evaluation.

Recommendation No. 13: USAID project officers will visit each of the program stations during the 1986 cropping season to become more fully aware of research and outreach programs.

Action Taken: Both Mr. Mitchell and Ms. McCarthy, the project monitor prior to Mr. Mitchell, visited each of the stations during the 86 season.

Recommendation No. 14: The PIL for Small Value Emergency Procurement will be continued.

Action Taken: This PIL has been continued and resources have been added.

Recommendation No. 15: An inventory system will be put in place by RAV/Coordination.

Action Taken: Price Waterhouse established an inventory system for the project.

Recommendation No. 16: Training of program fiscal officers on a scheduled basis will be completed.

Action Taken: Price Waterhouse has trained all of the fiscal officers.

Recommendation No. 17: Frequent dialogue should take place between RAV Coordination and USAID in an effort to alleviate, within USAID fiscal regulations, some of the inefficiencies and inconsistencies on the part of USAID in budgeting of CPF.

Action Taken: Weekly meetings are now held between RAV and USAID to discuss, among other things, the budgeting of CPF.

Recommendation No. 18: Another evaluation will be scheduled for 1988.

Action Taken: Currently being performed.

Recommendation No. 19: USAID will insist that all IITA staff travel to Zaire will be cleared through the IITA Director of International Programs.

Action Taken: There is now a joint clearance process between USAID and IITA.

Recommendation No. 20: PRONAM will focus on consolidating its program rather than expanding its geographical locations. Personnel levels of all programs will be held to that recommended in the Project Paper.

Action Taken: This recommendation was not wholly accepted. Personnel levels were frozen as of the time of the evaluation. Recently, 240 employees are been cut from the three programs at USAID direction

ANNEX 2

SCOPE OF WORK
FOR THE EVALUATION OF THE
APPLIED AGRICULTURAL RESEARCH AND OUTREACH PROJECT (RAV)
660-0091

A. Purpose of Evaluation

This second and final project evaluation constitutes a Threshold Decision Evaluation and will provide guidance for the design of the follow-on project. Its purpose is to examine how and to what extent the delivery of project inputs are leading to the achievement of desired outputs; and, whether the outputs are contributing to the progressive attainment of the project's goals and purposes. In addition, it will explore prerequisites to the sustainability of project strategy, activities, and outputs.

B. Project Description - Background

This project was conceived as a ten-year endeavor, divided into two phases of six and four years, beginning in 1983. Its objectives include assisting the Department of Agriculture (DOA) to increase its ability to carry out a coordinated program of applied agricultural research and to transfer research technologies to farmers. A DOA project management unit implements the project jointly with the International Institute of Tropical Agriculture (IITA).

The project supports ongoing DOA research in the genetic improvement of three food crops (cassava, corn, and legumes); maintaining and improving soil fertility; and, improving agronomic management practices, including crop rotation, intercropping, etc., all focusing on cost effective and efficient measures to increase yield potential at the farm level.

In order to integrate plant breeding and agronomic research on individual crops, farming systems research (FSR) was selected. The FSR component includes both socioeconomic and agronomic studies and involves farmers in the research process through on-farm varietal and cultural practice trials. In addition, a soil-mapping and classification unit was created to ensure that soil fertility is maintained in cropping systems developed under the DOA research program.

An outreach/extension component was initiated to develop linkages with public and private entities working directly with farmers and is closely linked to the FSR component.

A substantial training component was included to provide technical and management training in U.S. universities for 14 participants at the Ph.D. level and another 20 at the M.Sc. level.

In cooperation with the International Service for National Agricultural Research (ISNAR), a study of the organizational/management structure for an eventual national agricultural research institution, incorporating existing entities, was completed in February 1985. Some of the recommendations proposed in this study have already been implemented. Others are still under study.

The project was initially authorized to have a six-year first-phase LOP funding level of $10 million (1983 - 1989). It has since been amended to increase LOP funding to $15 million and extend the PACD to September 1990. The planned second phase of the project will take the form of a follow-on project. The PID and PP design will begin in February 1989.

C. Specific Issues to be Addressed

The evaluation team will be responsible for reporting on and analyzing the following items. For each of the major sections below, the team will be responsible for identifying any major constraints which appear to impede project implementation or preclude attainment of project objectives, distinguishing among those which are critical to successful achievement and those which are not. The team will also make recommendations for the remaining two years of project implementation in light of constraints identified during this evaluation and lessons learned.

1. Project Management and Administration

- Examine the progress of the project in establishing a national capacity to manage the three research programs' applied research activities in the context of linking dissemination of research results to increases in farm-level productivity. This will include an assessment of the institution's capacity to plan project activities: setting goals and targets, allocating personnel, material and finances (both local currency and dollar), and monitoring and reporting on problems and progress.

- Determine whether appropriate management systems (vehicle/fuel use, stock/inventory control, financial accounting systems, etc.) are in place.

- Assess frequency and quality of reporting. Are periodic plans prepared and submitted in a timely fashion? Discuss.

- Assess effectiveness of the project's internal evaluation process and results, as described in the project paper. This will include a review of the institution's ability to (1) re-examine project strategies in light of actual versus planned performance, annual work plans, and the revised implementation plan; and, (2) make adjustments based on the results of the above.

- Determine adequacy of monitoring and information systems. To what extent do they enable project staff to determine effectiveness of activities and strategy?

- Describe the contribution and overall quality of the project's managerial and technical assistance to strengthening RAV's capacity to carry out its mandate. Assess the size and composition of IITA technicians in view of job descriptions, past accomplishments, future objectives, and direction of project activities.

- Assess the size and composition of the Zairian staff in view of job descriptions, past accomplishments, future objectives, and direction of project activities.

2. Farming Systems Research Component

- Describe the responsibilities of the FSR component of the project, as it is employed and understood by project staff. Has the approach been defined in practical terms for all concerned staff?

- Describe and assess the extent to which FSR has been integrated into the research programs. Is it accepted and understood by management and staff as an integral element? Are operational mechanisms in place to employ this approach?

- Describe the linkages between FSR and research activities, and FSR and extension activities. To what extent have economists been integrated into the research programs? Given the functional definitions and linkages, is current staffing and organization appropriate? Propose and discuss alternatives.

- Assess the contribution of the FSR approach to the achievement of the project's goal and purpose. Has the FSR element identified the major production constraints at the farmer level? Has FSR identified approaches designed to overcome these constraints? Discuss. Have relevant and useful data, which is understood to include such items as market, transport, labor of productivity, and pricing information, been collected and analyzed? Does this information include gender-disaggregated portions?

3. Outreach

- Using concrete examples, assess effectiveness of the outreach strategy and activities. Quantify by listing the number of farmers, hectarage, and crop production increases resulting from the use of program-generated varieties. How is the effectiveness of the strategy and activities measured?

- Have sufficient rural outreach agents been identified for dissemination and adaptation of project-generated research materials? How was this accomplished? What criteria have been used to determine final selection of those entities with which the project will work? Were other choices considered?

- Describe the character and composition of the organizations identified (e.g. church-based development projects, public development projects, farmer cooperatives, women's groups, private sector commercial entities, or others). What are the actual and potential number of farmers and hectarage for each intervention? Determine numbers and level of participation of women as active members of these organizations or as recipients of project-generated benefits?

- Has some form of protocol or other agreement been instituted to delineate roles and responsibilities of the entities vis-à-vis the project, and vice versa? Discuss.

4. Institution Building

- In the context of the recommendations proposed in the GOZ's Executive Council/ISNAR-assisted reorganization study, what progress has been made to ensure unified direction and control of agricultural research within the GOZ's Department of Agriculture?

- Describe the linkages established and relationships between RAV and other GOZ institutions, between RAV and other agricultural development projects (including other USAID-financed projects).

- Assess the quality of short- and long-term training. Are sufficient numbers of Zairians being trained in both technical and managerial areas as to obviate the need for external technical assistance in the future? Is the distribution of skills consistent with the project paper and training plans? Are former participant trainees returning to the project as planned? Identify any constraints and propose solutions.

- In the post-PACD (of this project or the last of its follow-on projects) era, what assurance is there that RAV/PRONAM/PNL/PNM will not suffer from inadequate institutional support, both personnel and financial. What steps have been, or should be, taken to ensure that relevant project activities will continue after USAID financing is completed?

5. Technical Issues

- List and critique the genetic selection criteria for each program, in light of Project output numbers 1, 6, and 8 in the Project Paper and Project Components 1 and 2. This critique should include a discussion of the technical soundness and functional adequacy of breeding programs; responsiveness of programs to farmers' needs and constraints to increased production; the use of mass selection as part of the breeding program for developing corn lines for farmer use; the development of (corn) hybrid varieties for farmer use; and, the relative merit of including soybeans in the project's research program. (Note: Output 1. "A coordinated and integrated foodcrop applied research program - cassava, corn, and grain legumes - involving the principal food crops with forward and backward linkages to extension and the farmer through the use of the farming systems approach." Output 6. "Zairian personnel trained in technical and managerial skills in sufficient number to manage and carry out applied/adaptive research on major food crops." Output 8. "Improved seed, planting materials, and cultural practices tested under farm conditions, demonstrated and employed by at least 29,800 farm families in four major regions by year eleven." Project component 1 is the genetic improvement of crops and component 2 is the improvement of agronomic practices.)

- Assess the use of insecticide as a potential means to generate insect resistance; fertilizer at the farm level testing/extension phase; "antennes" (intermediary stations) as opposed to on-farm testing.

- Examine the selling of seed for commercial use. Assess the need for, and type of, seed quality standards.

- At the station level, assess the use of crop rotation, other soil fertility practices, and water utilization.

6. USAID Oversight

- Assess the level and adequacy of USAID oversight, including project implementation monitoring, procurement actions, budget planning (for both dollar and local currency), and follow-up on recommendations from 1986 evaluation. Identify problem areas, both actual and potential, and propose solutions.

D. Team Composition and Qualifications

The Evaluation Team will comprise four external evaluators and four observers. The four observers will be from the following organizations: AID/Washington, REDSO/WCA, IITA/Nigeria, the Direction de l'Administration Generale des Projets (DOA-GOZ), and the Direction Services Etude et Plannification (DOA-GOZ). The external evaluators will include a Management Specialist, who will also serve as Team Leader, a Policy Specialist, a Farming Systems Research/Extension Specialist, and a Plant Breeder. Individual qualifications and summary Scopes of Work follow.

Team Leader - Management/Agricultural Research Institution Specialist

Qualifications: M.Sc. degree required, Ph.D. preferred, in an agriculture- related field. A minimum of ten years of experience managing a public or private agricultural research institution. Subsaharan Africa experience strongly desired. Prior experience as Team Leader for evaluations of A.I.D. agricultural development projects essential. French language proficiency also essential.

Specific Tasks: The Team Leader will be responsible for analyzing and reporting on the issues outlined below (see also Reporting Requirements - Section F). This individual will be responsible for identifying any major constraints which appear to impede project implementation or preclude attainment of project objectives, distinguishing among those which are critical to successful achievement and those which are not. He will also make recommendations for the remaining two years of project implementation in light of constraints identified during this evaluation and lessons learned.

1. Project Management and Administration
   - Linkage of FSR/Outreach/farmers and research stations
   - Effectiveness of internal management process (including planning, execution, and evaluation of management systems)
   - Reporting, as required by USAID
   - Staffing levels and competence of both TA and GOZ
   - Management by IITA
2. FSR Component
   - Management
   - Institutionalization of FSR
3. Outreach
   - Management and effectiveness
   - Reporting systems
   - Protocols/agreements with NGO/PVO institutions
4. Institution Building
   - Progress towards the establishment of a viable national agricultural research institution
   - Quality of technical and managerial training
   - Linkages with other organizations and agencies
5. USAID Oversight

Agricultural Policy Specialist

Qualifications: Ph.D. in Economics or Public Policy, with specialization in the field of agricultural policies is required. Ten years of experience in formulating national agricultural policy and in conceptualizing and establishing agricultural research institutions in developing countries. Familiarity with issues concerning financial sustainability of such institutions essential. Experience must include demonstrated ability to work with upper level host government officials. Experience in subsaharan Africa strongly desired. French language proficiency essential.

Specific Tasks: The Agricultural Policy Specialist will be under the general guidance of the Team Leader. He will be responsible for submitting a draft report to the Team Leader ten days prior to the end of his contract. The report will address the issues outlined below, identifying any major constraints which appear to impede project implementation or preclude attainment of project objectives, distinguishing among those which are critical to successful achievement and those which are not. He will also make recommendations for the remaining two years of project implementation in light of constraints identified during this evaluation and lessons learned.

1. Institution Building
   - State of current national agricultural policy
   - Formulation of agricultural policy
   - Divisional responsibilities for policy oversight
   - Institutional linkages and support
3. Sustainability
   - Project strategy, activities, and outputs
   - Future of agricultural research in the absence of external funding
3. Other issues as requested by the Team Leader

FSR/Extension Specialist

Qualifications: M.Sc. in an agriculture-related field required. A minimum of five years of field experience in Africa in the design, execution, and/or evaluation of FSR/Extension activities essential. French language proficiency required.

Specific Tasks: The FSR/Extension Specialist will be under the general guidance of the Team Leader. He will be responsible for submitting a draft report to the Team Leader ten days prior to the end of his contract. The report will address the issues outlined below, identifying any major constraints which appear to impede project implementation or preclude attainment of project objectives, distinguishing among those which are critical to successful achievement and those which are not. He will also make recommendations for the remaining two years of project implementation in light of constraints identified during this evaluation and lessons learned.

Upon arrival in Kinshasa, the Evaluation Team Members will meet with USAID staff to discuss the purpose of this evaluation as well as the individual scopes of work. Any changes deemed necessary will be made at this time. Following a thorough review of the project documents, the team will meet with representatives of the Department of Agriculture of the GOZ and senior members of the TA team.

This evaluation is expected to require five six-day weeks. The proposed work plan and travel itinerary follow.

DATE	ACTIVITY
Week One:	
Days 1 - 3	Orientation and introductions; initial briefings with USAID, Deptartment of Agriculture, RAV, IITA staffs; review of Scopes of Work and travel plans; review of project documents;
Days 4 - 6	Three-hour road trip to Cassava Research Station at M'vuazi, Bas-Zaire; meetings with PRONAM Director Muhungu; visits to antennes; lodging at station;
Day 6	Return to Kinshasa in the afternoon;
Week Two:	
Day 1	Commercial flight to Lubumbashi; afternoon briefings;
Days 2 - 6	Briefings, visits to PNM Corn Research Station, TRABEZA (Private Seed Company), Gecamines, Project 105 field office;
Day 7	Departure of Policy Specialist for Kinshasa via commercial flight; Departure of others for PNL Research Station at Gandajika by charter;
Week Three	
Days 1 - 3	Team leader, FSR/E specialist, and Breeder remain in Gandajika for briefings and visit to station; Policy Specialist in Kinshasa for meetings with GOZ, World Bank and FAO representatives;
Day 3	Afternoon departure of three for Lubumbashi via charter;
Day 4	Three return to Kinshasa by commercial air;
Day 5	FSR/E and Team Leader travel to Kiyaka by charter; visit of facilities; overnight there;
Day 6	Afternoon return to Kinshasa;

Week Four

- Days 1 - 5 Preparation of draft report
- Day 6 Draft presentation; informal review of
-- report by COP/IITA, Project Officer and
-- Evaluation Officer/USAID, RAV Director;
-- and three research directors;
- Day 7 Departure of FSR Specialist and BREEDER;

Week Five

- Days 1 - 2 Finalization of Draft report;
- Day 3 Submission of final Draft report;
- Day 5 Formal review of report by USAID;
-- Evaluation Team; Directors Mapela
-- and Mubinga, RAV Director, COP/IITA,
-- and USAID STAFF;
- Day 6 Last corrections; submission of final.
-

1. Farming Systems Research Component
   - Definition, integration, and contribution of FSR
   - Effectiveness of FSR in identifying farmers' constraints
   - Future of FSR
   - Data collection, analysis, and reporting systems
2. Outreach
   - Effectiveness of strategy and activities
   - Criteria used for the selection of outreach agents
   - Number and characteristics of rural development organizations and farmers identified by project
   - Quantifiable measures of project's progress
3. Other issues as requested by the Team Leader

Plant Breeder

Qualifications: Ph.D. in plant breeding required. At least five years of experience as a breeder in a corn- and/or legume-breeding program at a public or private research institution. A minimum of three years of relevant breeder experience in a developing country essential. French language proficiency strongly desired.

Specific Tasks: The Plant Breeder will be under the general guidance of the Team Leader. He will be responsible for submitting a draft report to the Team Leader ten days prior to the end of his contract. The report will address the issues outlined below, identifying any major constraints which appear to impede project implementation or preclude attainment of project objectives, distinguishing among those which are critical to successful achievement and those which are not. He will also make recommendations for the remaining two years of project implementation in light of constraints identified during this evaluation and lessons learned.

1. Breeding Programs
   - Genetic selection criteria, especially related to the requirements of small farmers
   - Technical soundness and appropriateness for small farmer needs
   - Use of mass selection in corn program
   - Use of insecticides
   - Use of fertilizer at farm level
   - Seed quality and control standards
   - Soil fertility practices and water use at station level
   - Constraints to increasing on-farm testing
2. Other issues as requested by the Team Leader

E. Methods and Procedures

The Evaluation Team members will report to the Evaluation Officer and be under the technical guidance of the Chief of the Agriculture and Rural Development Division, USAID/Kinshasa.

F. Reporting Requirements

The Team Leader will have overall responsibility for preparing the Evaluation Report, including a summary of the contributions of the other team members. The report will document the salient issues, progress, and constraints identified during the the course of this evaluation, as outlined in Sections A and C of this Scope of Work.

The Team Leader will submit ten copies of the draft report to USAID's Evaluation Officer five days prior to the end of his contract. This report will include the following: (1) the Executive Summary of two to three pages in length (including the purpose of the activity being evaluated, purpose of the evaluation and the methodology used, findings, conclusions, lessons learned, and recommendations); (2) Body of the Report of no more than 15 pages (including a discussion of the purpose of the evaluation, the study questions, and the significance of the resulting recommendations); and, (3) Appendices (including technical issues raised during the evaluation requiring greater elaboration, the specific contributions of each of the team members, a copy of the Evaluation Scope of Work, a brief annotated bibliography of the documents and reports consulted, and a list of the persons and agencies contacted).

Following the submission of the draft report, a preliminary working session will be held with the Evaluation Team, USAID and project staff to discuss findings and recommendations. The Team Leader will then incorporate in the final draft version of the report the subsequent consideration of any questions or issues raised during this initial review meeting. The Team Leader will then submit ten copies of the final draft report two days prior to his departure. This final version will be reviewed in a meeting with the Mission Director, the Evaluation Team, and other interested USAID staff.

ANNEX 3

PROJECT MANAGEMENT AND ADMINISTRATION

1. Highlights

AID finances training, technical assistance, procurement of equipment and supplies, and local costs under Project 091. Training is well conceived, is of good quality and is now being fully implemented, although it is out of synchronization with the technical assistance provided by IITA. The latter plays mixed roles in managerial, technical and administrative direction and technical and administrative assistance. Its performance is uneven.

USAID procures all equipment and material and this has been largely a failure. This is the single most important constraint to reaching the project objectives. It is strongly recommended USAID turn over to IITA responsibility for procurement.

Almost all of the project's operating (and some capital) local costs are financed by AID with counterpart funds. It appears they are insufficient to support an adequate research program. This is a major constraint to realizing project objectives. It is strongly recommended USAID and RAV analyze in a systematic way what can be done to increase the level of support.

The institutional arrangements created under Project 091 are in place and working. Managerial systems are operating, although they could be improved. Several recommendations and suggestions are made to strengthen the institutions concerned.

Planning, programming and budgeting procedures have been adopted but they are not objectives oriented. The lack of well-defined research objectives is a constraint. It is recommended a strategic plan and a five year plan of program and budget be developed and approved.

IITA plays a not very well defined role. Its performance is uneven. This constitutes a major constraint in realizing project objectives in FSR and outreach/extension. It is recommended the Institute replace the present leadership of the IITA team with a senior member of the permanent IITA Nigeria staff with a proven track record as a leader and manager.

USAID management has not actively monitored the substance of the project. USAID at the working level is micro-managing. It is recommended USAID make a systematic evaluation of its role in the project, but in any event pay closer attention to the critical substantive issues and avoid administering project details.

2. Introduction

A. Expected Accomplishments

The framework of project 091 project management and administration appears in the section of the Project Paper entitled "End of Project Status" on pp 20-21 outlining "significant accomplishments" to be attained by the end of the project. These are: (a) a trained cadre of Zairian research personnel in place; (b) an in being and effective organization capable of directing and managing food crop research in the country; (c) FSR installed and operating; and (d) integration of crops research, FSR and outreach/extension leading to research activities more relevant to the farmer.

B. Projected Inputs

These accomplishments are to be made possible by USAID-financed inputs of (i) training; (ii) external assistance provided by IITA; (iii) organizational, personnel and operating costs of a new Zairian food crops research structure consisting of a central coordinating ofice (RAV) and three national research programs for cassava, maize and grain legumes; (iv) procurement of vehicles, equipment and other material to enable the program to operate effectively; and (v) the creation of a soil mapping unit and the conduct of a soils survey.

C. Summary of Project Accomplishments

(1) The training program is now fully implemented but several years later than planned. The bulk of the trainees will return at or after the completion of the present phase of the project. Thus a fully competent, professional Zairian staff will not be at work at the programs at the PACD.

(2) The coordinating mechanism (RAV) and the three national programs are fully operational. The modalities are established and the management systems function mechanically if not imaginatively for the definition of priorities, planning, programming and evaluation. Satisfactory financial, supply, and vehicle management policies and procedures have been installed and are used, even if they are not always well understood or utilized efficiently. In any event they are accepted as a way of managing and administering research. The personnel system for the project is that of the GOZ. However only through the payment by USAID of benefits known as "primes", are the programs able to attract and retain able people.

(3) FSR, discussed in detail in the FSR report, has spotty acceptance and is not effective in two of the three programs.

(4) Integration of crop research, FSR and Outreach/extension has not occured. As stated in (3) above FSR is making a meaningful contribution in only one program. Outreach/extension is a significant activity in one program and weak in the other two. This is discussed in the Technical Issues, FSR and outreach Reports.

D. Evaluation of Inputs

(1) Training. The full program is now completely underway, although out of synchronization with the forecast of the project paper that all trainees would return and be working with the IITA staff in the programs well before project completion. The training effort is reviewed in the Training Report.

(2) IITA has recruited an expatriate staff, originally planned to number 14 in the PP. Thirteen are now in Zaire. The mix of specialties is somewhat different from that contemplated in the PP. All are on contract to IITA; none are members of IITA's permanent staff. Whether because of this fact, the difficulties faced in recruiting for work in Zaire, or the dispersal of IITA staff among the National Programs, the Institute's performance has been uneven. Effectiveness has turned largely on the ability of the specialist himself/herself to carve out a personal role. IITA staffing and its positioning have been a major constraint in FSR and outreach in achieving project objectives and a constraint affecting the rest of the research objectives.

(3) AID financing has resulted in the creation of an operational coordinating group in Kinshasa and the functioning of three national food crops research programs. However, the entire effort is totally dependent on USAID financing all foreign exchange costs and the bulk of recurrent and capital local costs. Counterpart fund generations are the source of AID's local cost financing. The amount of these funds varies from year to year and there are other competitors for them. While RAV's and the National Programs' management of these funds is less than optimum, nevertheless it is probably still true that the level of counterpart fund support is significantly short of what is required to field an adequate research food crops research program. In this connection it is ironic that if all the National Programs were satisfactorily equipped and housed, operating budgets would have to be increased. This is a major constraint to attaining project objectives. In the short run, it is strongly recommended that the GOZ and USAID examine in depth and reach an understanding on the amount of counterpart fund support required during the remaining life of Project 091 to finance it adequately. It is further recommended the matter be thoroughly analyzed as part of the project design of any follow-on project.

(4) The project finances the procurement of all vehicles, equipment and other material required for the project. As discussed later in this report, this USAID-managed activity has until now been largely a failure. The National Programs are to a noticeable extent operating with vehicles, equipment and supplies ordered and delivered before Project 091 became operational. The lack of these items, most of which should have been ordered long ago and delivered, is probably the single most important major constraint to the realization of project objectives. For effective research to be done, personnel must be able to travel easily and regularly outside their research stations, have satisfactory equipment in their laboratories and be able to keep up their professional competence and remain abreast of developments in their fields through access to adequate libraries. Because of the lack of performance in the management of procurement the researchers cannot do research of the depth, breadth and quality the task requires. At worst this lack can give the less able an excuse for indifferent performance. It is strongly recommended that procurement overhauled and reformed as a matter of the most urgent priority as recommended in the "USAID Oversight" section of this report.

(5) The soil mapping unit was not created. This may have been a constraint but not a crippling one. However, the lack of effective soils research will be a severe handicap in the future. It is probably now too late to get this effort underway before the PACD. It is recommended that an in depth analysis and formulation of a soils research effort be undertaken as part of the design of any follow-on project.

3. RAV and National Program Management of Research

A. General

The food crops research program assisted by Project 091 has been almost wholly financed by AID. The principal management innovation has been the creation of a central coordination body, RAV, and the bringing together of the food research programs for cassava, maize and grain legumes under RAV. The three national organizations carrying out these programs were and are crop improvement oriented. This is particularly true in the case of the older National Programs, PRONAM and PNM, less so of PNL.

PRONAM and PNL have strong, purposeful, leadership. PNM's situation is different, the IITA maize breeder being a strong management force. Because of this background and the character and regard accorded to individual IITA specialists, the thrusts and emphases of the three National Programs vary considerably. In PRONAM crop improvement research is strong, although perhaps the major research base should be shifted; outreach energetic and effective; and FSR auxillary to crop research. The situation at

PNM resembles that at PRONAM except outreach is also a peripheral activity. PNL's crop research and FSR are vigorous but outreach activity is weak. This weakness in one or more components constitutes a major constraint to what should be an integrated research program forecast by the PP and is impeding both the dissemination of research results and the feedback of farmers' inputs into research. In two instances observed by the Evaluation Team, the USAID Central Shaba and PROCAR projects, the interaction between the National Program and extension organizations seemed to be more dependent on the initiative of the latter than the former. In fairness to the National Programs, however, it must be kept firmly in mind that (i) Project 091 was not designed as a vehicle for direct extension by the National Program but as a means for creating links between the National Programs and the extension organizations; and (ii) the progam are short of operating funds. If indeed the extension organizations are picking up and speeding the results to the farmer of the Nati/nal Programs' work, without much push by the National Programs, these organizations have at least had "something to extend" provided by the National Programs. The question for the future may be, however, whether the momentum, foresight, imagination and expertise exist for the National Programs to have "new products to sell".

A very important factor promoting (i) cooperation among the National Program; and (ii) integration of their effforts is the stationing of researchers from each program at the major research locations of the others. This is an excellent concept and is obviously working successfully.

RAV Coordination in Kinshasa functions satisfactorily as an administrative mechanism and is active in budgeting matters. It does not play a leadership role in research matters, serving primarily as a consensus builder.

Planning and programming are still in their infancy. Each National Program prepares an annual work plan (Plan de Travail) for the following year. Since 1987 RAV has held an annual scientific, i.e. program, review in which the plans of all three National Programs for the following year are discussed, reviewed and changes made, apparently on a consensus basis. No document is prepared formalizing the decisions reached at this review. it is suggested this be done. The review serves as the basis for preparation of annual National Program counterpart fund budgets which are submitted to RAV in October and usually approved by USAID in November.

The annual work plans by their very title demonstrate they are not generally statements of medium or long term research objectives. Logically they should represent a forecast of what is proposed to be done within the context of an approved medium term, say five year, program to carry out a strategic plan of research objectives. PNL does have such a document but it is not known what use has been made of it. In order for research to be concentrated on objectives, it is recommended that each National Program prepare and obtain RAV's approval of a medium term research plan of program and budget derived from and implementing an approved strategic plan of research objectives. In turn it is recommended that RAV go through the same process for the entire foodcrop research program. In this manner the framework for an objectives oriented research program can be developed and adopted. This would serve as a firm base for determining what should be the nature of the effort to be approved and managed by the GOZ and supported by AID in any follow-on phase. It is recommended that the planning by objectives approach be made the centerpiece of the project design of any follow-on phase.

B. Personnel Management

(1) Two major groups of GOZ government employees work on the project. The first, designated "sous-statut", are permanent staff with tenure. They are incorporated in the "Fonction Publique" of the GOZ and paid out of a central government budget. In the case of the relatively few "sous-statut" employees working under Project 091, the basic salaries are paid directly by the GOZ and accordingly are not budgeted for in the counterpart fund budget. However, USAID does pay "primes" of this group and they are included in that budget. The great bulk of the staff employed by RAV and the National Program are recruited on a contract basis and are known as "sous-contrat" employees of the GOZ. Their salaries, salary categories and qualifications are the same established for sous-statut employees. USAID pays their base salaries and "primes". All other associated personnel costs, e.g. medical care, are financed out of the counterpart budget for both categories of employees. In both/cases, the base salaries are lower than those paid by INERA, the National agricultural research institution. It is recommended that USAID negotiate with the GOZ to have the project sous-contrat staff converted to sous-statut. The Institution Building Report states that cost savings of up to 30% in the personnel costs of the National Programs' counterpart fund budget could be achieved by this shift.

(2) USAID has been concerned with what it considers to be excessive staffing levels. The following table shows the percentage of total counterpart fund budget represented by personnel costs for each of the National Programs and RAV Coordination.

PERCENTAGE OF OPERATING FUNDS ALLOCATED TO PERSONNEL EXPENSES

	1986	1987	1988*	1989**
COORDINATION	10%	19%	17%	18%
PRONAM	26%	67%	72%	48%
PNM	17%	50%	53%	44%
PNL	14%	51%	62%	48%

* As of third quarter
** As budgeted

Personnel staff levels vary considerably among the Programs. For example, PRONAM is not more important nor its program inherently more complex than those of the other two but its staff is much larger as is its counterpart budget. This may be justified but RAV and the Programs need to have criteria for determining staff levels and composition. If RAV and the National Programs move to an objectives based research effort as recommended in section 3 of this report, a sounder base will exist to plan and establish staffing levels.

One generally used yardstick applied in agricultural research is that personnel costs should not exceed 55-60% of total current operating costs. As this table demonstrates two Programs' level of personnel expenditure for this object have at times exceeded this measure of cost evaluation. This is clearly the reason why USAID in July 1988 directed that the total staff level be reduced by 240. This reduction has not yet been put into effect.

Elsewhere in this report, concern is expressed about the manner in which this was done. In any event, leading forward to 1989, as the table forecasts this situation is being corrected. In the future, the utilization of formulae such as the one indicated above to arrive at a standard for proper staffing levels would be helpful in avoiding the problem encountered this year. Further, in assessing other operational costs, one standard guide is that they generally are at least $10,000 per researcher per year.

It is suggested that in the future USAID and RAV/IITA work cooperatively on criteria and formulae to determine personnel requirements. Looking toward a follow-on phase, the Evaluation Team recommends the question of staffing be integrated into a different concept of project design than has been used in the present phase. This is discussed in section 3 of this report.

(3) The personnel policies are those of the GOZ. Each program has a Personnel Officer reporting to the Director. From a brief observation, it is believed the personnel rosters are up to date and job descriptions exist. The Personnel Officer prepares the monthly payroll and transmits it to the Accounts Officer for further processing and payment.

C. Financial and Supply Management

(1) Section heads in a National Program prepare annual counterpart fund budgets. They are put together on a "line item" basis and are reviewed by the Program Director, consolidated into a Progam budget submitted to the RAV Coordinator, usually in October. In turn RAV Coordination reviews and discusses the budgets with the Program Directors and presents the budgets to USAID for approval. USAID usually takes action in November.

Because of rapid inflation the amounts budgeted for a National Program begin early in the year to fall short of the amounts required to finance approved line items and constant adjustments have to be made in line items. See Annex 16. The management of funds is made more difficult by the reported policy of USAID not to allow National Programs to include an inflation factor in their budgeting. To deal with this problem, it is suggested that USAID and RAV agree on an inflation factor before budgets are prepared to be used in budgeting for the following year.

The National Programs have no control over foreign exchange resources. They prepare their budget requests without knowing whether an item is to be financed by local currency or foreign exchange. The budgets they submit are strictly those to finance with counterpart funds.

The National Programs do have other sources of funds. First the GOZ allocates Budget Ordinaire or Budget d'Investissement funds to RAV and the National Programs (See Annex 15). One of the National Programs may budget for these funds but it appears at least one other does not. Second, income earned from sales of production and foundation seed. Third, the Programs earn interest on bank accounts. Revenues from these do not enter into the budget submitted to USAID.

In order to bring into being a complete, integrated financial management system, the budget should be expanded to include the financial resources represented by these non-counterpart fund revenues. For notional purposes, the costs of sous-statut personnel might usefully be included as well, so that managers would have available in systematic fashion an authoritative statement of all the funds flowing to the National Programs for expenditure. Logically foreign exchange requirements should be included in the budget if they are not already included.

Accordingly, it is recommeded that a comprehensive budgeting system be installed covering all local currency resources and costs and, if feasible, foreign exchange flows. Further, and it is understood this is under consideration, it is suggested that annual budgets be divided into operating and capital budgets and a definition of "capital" be adopted.

(2) Each program has an Accounts Officer reporting to the Director. He is responsible not only for day to day financial administration but also supervises stores, including fuel.

Quarterly financial reports are prepared by the National Programs and submitted to RAV. It was difficult to ascertain during the brief visits of the Team to the National Programs whether they are used as a management tool or are simply considered as "one more form" to be filled out.

RAV follows a two signature check signing policy. This is sound. However, in the case of PNM, the Accounts Officer is an authorized signatory in the absence of either the Director or the Principal Adviser (IITA). This is undesirable. It puts the Accounts Officer in the position of both requesting and participating in payment. It is recommended that this practice be stopped and that a sufficient number of signatories be designated so as to anticipate the absence of either the Director or the Principal Adviser.

While some external audits have been performed, it is recommended that an external auditor be retained as to make annual financial, and if feasible, management audits of each National Program and RAV. This would serve as an incentive and goad to financial and management efficiency.

Financial, supply and vehicle management systems are in place or in the process of being implemented. With respect to the first two, Price Waterhouse prepared in 1986 a manual for use by the National Programs for accounting, supplies and payrolls, including prescribed forms. The manual is being used. The manual also gives to the National Program Director direct control of all expenditures over Z10000. The entire system is very simple and as time goes on should be improved. No requirement appears to exist to affix property tags to capital assets.

While these systems are sound in conception, their administration is in the early stages of development, particularly the management of fuel and supplies, including spare parts. the stores of two of the three National Programs leave a great deal to be desired in terms of orderliness and arrangement of stocks.

C. Vehicle management

The vehicle fleet is critical to the efficient operation of the National Programs. Largely because of the failure to receive timely delivery of new vehicles and spare parts, none of them has anything approaching a vehicle inventory in satisfactory operating condition. Each National Program maintains and repairs its own vehicles and farm equipment in very simple facilities. The situation at PNM is particularly bad. Since it is located near a large city, it is suggested that PNM explore the feasibility of commercial vehicle maintenance and repair. PNM's reported present position is this would "cost too much" but the Team did not see any cost analysis supporting this conclusion.

The management of vehicle operations is simplified by the few number fit for operation. PRONAM is to be commended for installing a system to consolidate vehicle use so as to make this scarce resource serve as many customers as possible.

With regard to vehicle procurement, after an excruciatingly long period of indecision, a determination was made to equip National Programs with Toyota Hi-Lux double cab pickups to serve as dual purpose vehicles. Prima facie this would seem to be a poor choice. The Toyota's lightness, its shortcomings as a cargo carrier and its unsuitability as a vehicle to carry passengers for any distance over poor roads or pistes argue against its purchase. It is suggested that, late in the day though it is, the decision to purchase this vehicle be re-examined.

D. General Administration

All three National Program Directors supervise the Programs' administrative elements themselves, with the key figures, the Personnel and Accounts Officers reporting directly to the Director. Assisting the Program Director is the IITA Prinicpal Adviser, discussed in Section F below, A suggestion has been made to create the position of administrative officer reporting to the Director of each of the Programs in order to release the Director of the burden of directing personally finance and administrative units. No Program appears to be large or complex enough to warrant this. The two Directors who are "hands-on" administrators probably would find it difficult to relinquish their grip even if the positions were created.

Another idea has been put forward of appointing a research director and an administrative director for each Program in place of a Program Director, both reporting directly to Directors of Research and Administration at RAV. Thus, there would be two bosses for each Program working for two officers at the same level in Kinshasa. This would mean a highly centralized but split operation with all differences in the end having to be settled by

the Coordinator himself. Under this arrangement no one short of senior management of RAV could direct the local administration to provide services to the program research director, if the former have declined to do so when the requested by the latter. No benefits are foreseen from an arrangement which would both diffuse and centralize authority and responsibility.

E. Reporting, Monitoring and Comunication

A number of arrangements exist under Project 091 to facilitate communication within and monitoring of Project 091.

Each IITA Principal Adviser sends a quarterly report to the IITA Chief of Party who in turn sends an overall quarterly report to USAID. This is done but it is understood that a good deal of effort has been required by USAID to make sure this report is up to an acceptable standard.

Each National Program issues an annual report, a yearly research highlights report as well as the annual work plan described above. It is understood each Program Director submits a quarterly activities report to the RAV Coordinator.

The National Program Directors are scheduled to meet quarterly with RAV but this schedule has not always been adhered to. The IITA Chief of Party is charged to visit each National Program quarterly but this has worked out in practice to about three times a year.

An annual scientific (program) review, described above is held each year to reach agreement on the following year's program and preparatory to the submission of the annual counterpart fund budget. After the budgets are submitted in October, the Program Directors meet with RAV Coordinators. There are frequent meetings throughout the year between USAID and RAV Coordination on budgetary and financial management matters.

The Program Directors hold regular meetings with their sections, sometimes as frequently as once a week. The Programs, as discussed above, submit quarterly financial reports to the RAV Coordinator. At the beginning of the year RAV issues to the Program an estimate of the monthly flow of expenditure.

4. IITA

The PP, curiously in view of the important role IITA was to play, says relatively little about IITA other than to specify the disciplines of a projected 14 member team and to sketch in how some of the IITA staff would be distributed among the National Programs. At page six the PP says "The need for external assistance over an extended period stems from [the fact that] .... (b) the newly

trained personnel will need direction and technical and especially managerial support which only more experienced help can provide". The PP thus assumed the training program would get underway and be completed in time for the IITA team to support these returning trainees. This will not occur.

The Cooperative Agreement between USAID and IITA became effective on 29 July 1985 with the signature of the IITA Director General, following execution of the Agreement by the USAID Director on 17 July. Interestingly enough, while the 091 project is described in the Agreement and detailed job descriptions of the IITA/team members are set forth in the Agreement, there does not appear to be any scope of work as such for IITA. Instead the work to be done by IITA is contained in the job descriptions. From these as well as the composition of the team it is clear that IITA was given an inconsistent set of tasks to perform. To some extent the Institute is to be director of the project; to some degree it shares responsibility for project management with RAV; and lastly it is to render technical assistance. The Chief of Party is to provide "professional technical and managerial counsel to the Zairian counterpart Project Coordinator; and thereby jointly implement the project". The IITA scientists may do, direct and/or advise on research. IITA is also to provide personnel for administrative assistance.

The mixture of managerial/administrative responsibility, technical direction and technical and administrative assistance has placed IITA in an awkward position, further complicated by the designation of an IITA scientist in each National Program as Principal Adviser (Conseiller Principal) to the Director of the Program. While this title speaks in terms of advice to be given, the Principal Adviser has in fact become the alter ego or deputy to the Director. Typically he co-signs with the Director all administrative notices.

As a consequence, it is understandable why USAID and perhaps the GOZ consider IITA to be co-manager of the project, except for procurement and important aspects of training, for which USAID is responsible.

This concept of IITA's role apparently was based on the assumption IITA is well equipped to provide managerial expertise to a national agricultural research program. This is a misconception. Generally, the International Agricultural Research Centers (IARCs) carry on their own research programs, conduct research as partners in cooperative research programs with national agricultural research organizations (NARs); lead or participate in regional research networks; and provide training at their own facilities. Not so commonly do they undertake activities in which they are retained for managerial and administrative expertise or to serve as advisers. Nor do they generally work on outreach or extension directly. Their focus is on research programs. Their

activities in institution building are functions of (i) setting an example as to how research ought to be conducted; (ii) being a partner in research programs; and (iii) providing training at their facilities.

If this is a valid statement of what the IARCs do or can do, this may explain why in part there is dissatisfaction in USAID with IITA in the performance of its "managerial" role, though not to defend it. In the judgment of the evaluator, IITA should not have been asked to be manager in the 091 type situation or to have been cast as a "technical adviser". If 091 had been designed as a research program rather than having up front the objective of "institution building", IITA would have probably turned in a better performance.

As it has turned out, IITA has not brought to bear any comparative advantage in the management of the program overall. Certainly as an IARC its expertise does not lie in outreach or extension. Whether because of all of these factors and/or the difficulty of recruiting qualified people for long term residence in Zaire, the IITA team is of uneven quality and is particularly weak in managerial skills. None came to Zaire directly from prior service in Nigeria as members of IITA's permanent staff. IITA management in Ibadan seems not to have had Project 091 high on its list of operational priorities and therefore gave to its effort in Zaire what appears to be fitful attention.

Two vacancies exist and one or more members of the IITA complement are known to intend to leave in the near future. Given the short time remaining before the expiration of IITA's committment, it is probably almost impossible for the Institute to recruit any further replacements.

The present distribution of IITA personnel is set forth in Annex 18. It is substantially different from what was contemplated in the PP. IITA specialists are dispersed among the National Programs. The positioning has been on the basis of filling positions to be taken up by qualified Zairian scientists upon their return from advanced training in the U.S., not to train these scientists. Thus the geographic distribution of IITA personnel and the intent stated in the PP about the relationship between the positioning of IITA staff and training are inconsistent. One unfortunate consequence of the scattering of the IITA team is that they work primarily on the Program to which they are assigned. This is not a problem in the case of the breeders and to some extent the economists but it has meant the soils scientist and the entomologist have not made significant contributions to other than PRONAM or PNM. In sum because of geographic dispersal, the IITA staff does not constitute a well knit team.

Therefore, the overall performance of IITA has not been as effective as it might have been and constitutes a major constraint to meeting project objectives. IITA's input needs to be strengthened for the remaining life of the Cooperative Agreement. It is concluded this requires more systematic attention by IITA top management. It is strongly recommended the Institute replace the present leadership of IITA team with a senior member of the permanent IITA Nigeria staff with a proven track record as a leader and manager. Further, it is suggested IITA and RAV (i) negotiate on the precise role to be played by IITA staff from now to the PACD; and (ii) consider phasing out before the PACD the Physical Plant Services and Vehicle Management positions. The Team believes Zaire possesses sufficient talent to fill these positions. The role of technical assistance in any follow phase is discussed in the Training Report.

5. Management of FSR and Outreach

The management, institutionalization and effectiveness /f FSR and outreach have been appraised in the Technical Issues, FSR and Outreach Reports. For the reasons outlined in these reports, this matter cannot be assessed because neither effort approaches effective operation and integration with crops research across the span of the three National Programs.

6. Establishment of a National Agricultural Research Organization

Progress has been made looking forward to the estabishment of a viable national food crops research institution but not one for all crops. For the forseeable future, both INERA and RAV will continue to pursue their separate destinies, particularly if the IBRD perseveres in its present apparent intention to revivify INERA. This issue is ventilated in depth in the Institution Building Report. The viability of RAV standing alone is wholly dependent on continued, substantial foreign exchange and local cost operating financing by USAID. Without this RAV will collapse. This substainability problem is reviewed in the same report.

7. Training

The quality of the short and long term technical training financed under Project 091 appears to be good, although only 4 out of 35 long term trainees have returned. No trainees have been or will be selected for managerial training since all slots have been reserved for technical training. In any follow-on phase, it is recommended that the project design consider a managerial training component as a priority concern. The Training Report considers this subject in detail and makes recommendations for any follow-on phase of the research effort.

8. Cooperation with Other Organizations

With respect to links to other institutions, RAV and the National Programs are gradually expanding their contacts with extension organizations in Zaire. The progress is most visible in the case of PRONAM. The IITA specialist based at M'vuazi since her arrival in May 1988 is continuing to establish links to organizations in Bas-Zaire and her accomplishment is noteworthy. The Outreach Report reviews this activity in all its aspects.

The ties to INERA are understandably weak, given the lack of INERA research activity and its apparent immediate concentration on export crops. The former Adjoint Technique in RAV Coordination has recently been named Director of Research of INERA. Whether this will increase cooperation remains to be seen. It is conceivable the energizing of INERA by this appointment and the prospect of substantial financing of INERA by the IBRD may encourage rivalry and friction between the two. This is discussed in the Institution Building Rep/rt.

Cooperation with organizations outside Zaire does exist and RAV has profited from assistance by the IARCs, IITA being the most prominent but CIAT and ICRISAT have also been helpful. Personal exchanges between IITA scientists and their counterparts abroad seem to be inhibited at present by the desire of the USAID Project Officer to sharply define which organizations they may travel to. On first glance, he seems to have little interest in workshops, conferences and the like outside Zaire which are not directly associated with a designated list of research centers. This is unfortunate. These other contacts considerably enhance the value and quality of the research effort. It is suggested that RAV/IITA and USAID agree on a budget for international travel of this character but that RAV/IITA decide themselves on specific trips without the intervention of USAID.

9. USAID Oversight

USAID has not only exercised oversight of Project 091, it has gradually expanded its role to encompass co-management of the project in critical respects. The foundation is the project design which reserved to USAID (i) management and administration of procurement; (ii) and execution of important parts of the training program. In addition, USAID has used the power of the purse to direct RAV to reduce national staffing and by a specific number.

At the same time USAID management at the level of the ARD officer and above does not appear to have been very active in following the substance of crop research, FSR and outreach and other major problems which have arisen. While USAID was represented at the August 1988 Lubumbashi scientific review, visits to the National Program at the USAID management level are

relatively sparse (See Annex 17). No one from USAID has been to PNL at Gandajika in over two years. Whether because of this or other reasons, major problems such as the shaky hold of PNM on facilities at Lubumbashi, the implications of major handicaps faced in operating at Gandajika: the slow progress toward integration of FSR and outreach with crop improvement research; and the fateful consequences of the paralysis in procurement seem not to have engaged the sustained attention of USAID management.

What has evolved is a kind of micro-management embodied in the position of the Project 091 project officer (the PP states a second officer was to /e appointed to handle technical oversight but this does not appear to have been done). It is noted that in three years there have been three project officers, each with a distinctive approach to the job. USAID management appears to have allowed oversight to become essentially a partnership with RAV or IITA in the administration of details in project implementation.

The problems this has raised are posed in the procurement of equipment and supplies. While prior to Project 091 IITA through its overseas purchasing agents was responsible for managing a substantial part of procurement under AID financed projects, this responsibility was taken over by USAID in Project 091. While the fiction of host country procurement is preserved (which adds to the complexity of the procurement process), in fact USAID does all the work once requests are received to purchase equipment and supplies. All requests go to the project officer, who reviews and in effect approves or disapproves them, and after this to the Commodity Management Oficer (CMO) for implementation. Not until the present project officer arrived in January 1988 does it appear urgent USAID attention was directed to the lack of performance in procurement. He instituted a status report which is continually upgraded. This is a prime management tool and undoubtedly has contributed to better performance in recent months. He is to be commended for this.

$4,500,000 is authorized for procurement under Project 091, as amended, of which $221,391 had been disbursed as of 30 September 1988. The disbursements presumably reflect actual deliveries. Assuming all of these are attributed to funds committed under the planned procurement level of $1,102,900 under the original project authorization, only 20% of the funds made available in 1985 are represented by deliveries. This is a very low figure, considering the age of the project.

Practical problem still remain. The most serious concern purchases of passenger vehicles, farm equipment and spare parts. Not all of the difficulties are of USAID's making. Many derive from the infirmities of AID'S procurement policies, practices and procedures. In any case, in Project 091 it has meant that while 24 vehicles are authorized for purchase , only 10 have been

delivered (10 more were donated by the British government), and 14 still have to be ordered and they may be of the wrong type.

The consequent lack of vehicles and vehicle spare parts has been almost crippling to the National Programs. The vehicles are needed for on-farm trials, village level surveys, demonstration trials, contacts with extension organizations etc. The deficiency in vehicle availability is the most serious major constraint observed by the Evaluation Team affecting project performance.

The most important questions are: (1) how much money is still available for procurement; and (2) how much ought to be purchased over and above what is now in the procurement process. On the first point, the maximum amount is the difference between $4,500,000 and the value of outstanding and completed purchase orders. This is approximately $1,900,000. The Evaluation Team understands that as a result of contemplated reprogramming of funds among training, technical assistance and procurement this figure may drop to almost zero. This at least reduces the scope of the problem even if it doesn't answer the question of whether there are additional critical items such as books and publications which should still be purchased under the existing project.

However, there is a substantial amount covered by outstanding PIO/C's but not represented by outstanding purchase orders which should be reviewed to determine whether they might be expeditiously purchased by using some other procurement arrangement. If at least an additional $250,000 in items still ought to be purchased and/or outstanding PIO/C's not represented by purchase orders exceed $500,000, the Evalaution Team strongly recommends that the present arrangements be overhauled at the earliest possible moment with a view to turning over to IITA responsibility for procurement of all items not a covered by an outstanding purchase order, with IITA/RAV/USAID agreeing on an illustrative list of items to be purchased. USAID informally advised the Evaluation Team this would take six months to a year to accomplish. A fallback recommendation is to ask REDSO W/CA for assistance.

The project officer is very active in many matters. The description of this position's duties in the Project Paper speaks in terms of monitoring. It is also true, however the Cooperative Agreement gives AID the right to give direct orders to IITA. In any case, in practice the position is a near "line" one. Foreign travel requires his de facto approval and he seems to make judgments on what should or should not be purchased.

Another major USAID intervention is in the management of RAV personnel. Together with all other projects supported with counterpart funds, "prime" levels are established across the board by USAID. This may be inevitable given the fact AID pays all the costs incurred for these benefits. What does not necessarily follow is the directive in July 1988 by USAID to RAV to cut

national staff levels by 240 through the device of denying the payment of higher "prime" levels approved in the directive. See Annex 19. The exact number apparently was not based on an analysis of staffing levels and composition. It is open to question whether this action should have been taken in this fashion. The evaluator believes it would have been preferable for the problem to have been tackled in the annual program and budget review process and not by unilaterally ordering the GOZ to reduce staff.

What the sum and substance of all these actions add up to is that USAID has become active partner in the detailed administratio/ of Project 091 along with RAV and IITA. This shared responsibility means authority for project management is diffused as well, with the unfortunate consequences described above. The Evaluation Team suggests USAID make a systematic evaluation of the role it is now playing, decide what it wants to do in the future and who should do it. In any case USAID management must be more active in monitoring what is going on concerning the substance of and critical issues in the project and at the same time make sure the Mission avoids micro-management.

ANNEX 4

TECHNICAL ISSUES

SUMMARY

Very useful crop of commodity-oriented agricultural research is being carried out in all three RAV programs. Several improved varieties have been released and further progress can be expected along this line since still better varieties are being developed for release in the immediate future (Table 1). Commodity-oriented research is being carried out at satisfactory level. Basically, most researchers, local and expatriate have their own research programs they run well with the limited means available to them. Regrettably the farmers are still not at the beginning, the center and the end of the research activities. although much needed, inproved cultural practices for most RAV crops are not yet available to the farmers. Besides the quantifiable type of outputs presented in the project paper, there is definitely a need to include improved farming systems as attainable project outputs. Understanding of the farming system research concept, approach and methodology is generally very poor among project personnel and its application uneven.

The present implementation of the programs is inadequate for the attainment of output 1 of PP in particular, namely a coordinated and integrated food crop applied research program with forward and backward linkages to extension and the farmer through the use of FSR approach. The already limited project research personnel staff is spread too thin. Consequently, the basic disciplines nucleus needed for eddective FSR/E does not yet exist at any of the three programs. Improvement is urgently needed.

The geographical spread of a project with a limited means has caused numerous problems of communicatinos, unnecessary duplicatins in efforts to provide each program with adequate facilities, equipment and personnel and has deprived the researchers of much needed technical or scientific interactions.

It is suggested that the basic structural organization for the project at the national Program level should be one direction for research management with two main divisions: one for technology development and the other for technology evaluation and transfer.

It is recommended that the next two years should be used to prepare for phase II of the project:

(a) training all research personnel in FSR concept, approach and methodology with detailed exercises in all four stages of the FSR methodology, so that all those concerned may have the same view about what is going to be done in the implementation of this project;
(b) making an exhaustive inventory of on-the-shelf technology;

(c) conducting rapid reconnaissance surveys to identify and then prioritize all constraints to increasing small farmers production;
(d) developing a research strategy aimed at removing these constraints;
(e) and designing a detailed over-all workplan for the duration of the project based on an approved research strategy.

Specific Technical Issues

1. PRONAM

A. Selection criteria

Selection criteria at PRONAM have not changed with its inclusion in RAV (1985). They have continued to be: to identify or develop high-yielding cassava varieties, resistance or tolerant to the main cassava diseases of bacterial blight, mosaic and anthracnose and to the main cassava pests, the mealybug and the green mite. These cassava varieties must also possess some specific quality characteristics in the leaves and the tubers used for human consumption. Additional selection criteria may be necessary in order to take into consideration variations in soil types and taste preference bebetween cassava producing areas.

These criteria should be seen as the most basic elements of a cassava breeding program in Zaire. Any attempt at validating them through a reconnaissance survey in the cassava producing areas will probably confirm this. However, this validation process is still necessary if an FSR approach is to be followed in this project. In fact, information received during the visit of the evaluation team at M'vuazi proved this point. The case of a particular farmer was mentioned during that visit who has expressed his need for a leafy cassava, because he was by far more interested in the cassava leaves than in its tubers. This information alone suggests that the validation process could indeed lead to the need to breed for three distinct types of cassava: a leafy cassava, grown essentially for the use of its leaves, a tuberous cassava grown to produce mainly tubers and a regular cassava which would produce an adequate amount of both leaves and tubers, as is presently the case. It is important to note that recognition of this need to breed these three distinct types of cassava would drastically change the content of the cassava breeding program, in part because of its implications on the new genetic and agronomic considerations that would have to be made. However, by necessity this effort would need to be justified by a determination of how many farmers would like to grow leafy cassava. It is already known that some farmers do not harvest the leaves of their cassava for fear of reducing yield in tubers, which constitute their primary interest. So it is known that interest in these three cassava types already exists. What is still to be determined is the proportion of each group of farmers in the cassava producing areas.

Another observation that might lead to some changes in the selection criteria for cassava concerns the wide variation in tuber yield that is observed regularly both on and off station. Particular attention should be given to finding the reasons for the extreme variation in cassava yields. Improvement in average yield can easily be obtained if conditions for these very low

productions can be identified and corrected. It is possible that these yield differences are genetically determined. In order to arrive at an understanding of this problem, data should be recorded and analysed regularly on soils characteristics and cultural practices associated with cassava production. Also actual rainfall distribution in relation to the cassava growth stage might need to be looked at. This research activity involves directly both agronomy and breeding as disciplines. But again economic considerations will probably determine whether it should be done or not. Economic questions that need to be asked include: Are these wide yield variations being observed much more with the local varieties than with the improved varieties? In this case, wouldn't it be cheaper to try to replace those local varieties by the improved varieties? How much increase in yield is to be expected to warrant this line of research? How long would it take to find corrections for these conditions? Can they be corrected?

These are only two observations that suggest that a validation by the client farmer of the cassava selection criteria is needed. It is through this participation of the farmer in the major decisions of agricultural research that a realistic prioritization of the constraints to increasing production can be made and a true relevancy of the research program to the farmer's needs be obtained.

Some exploratory surveys were conducted. Given their narrow scope, they can only lead to partial and tentative conclusions. More solid information is needed in order to establish the cassava breeding program on a more solid ground in terms of its importance for the cassava producer.

B. Breeding Programs

There are no questions to be raised on the technical soundness and functional adequancy of the cassava breeding programs. They are almost identical with only slight modifications to the already proven breeding programs of the international agricultural research centers such as IITA. However, a case should be made for the need to involve the farmer at a much earlier stage of the selection process than is actually done particularly in terms of the organoleptic characteristics of the material under selection. It is quite difficult to accept the fact that in a selection scheme that could last up to eight years, one should wait until the fifth year to find out that the material does not meet with the farmer's taste. Perhaps only cassavas of acceptable taste to farmers should be used in the breeding programs. Or some innovation is needed to make it possible to predict with some degree of confidence and at an
early stage of selection the level of acceptability by the farmer of the final product. This is important for it concerns the often raised question of research costs. How much resources can a breeding program afford to use in this fashion before it becomes

too much of a financial burden to be supported with no questions asked?

2. PNM

A. Selection criteria

The objective of the breeding section of PNM is to identify through introduction and/or breeding followed by appropriate testing primarily open-pollinated corn varieties with good yield potential and an acceptable level of resistance to streak virus and leaf blight. The selection criteria also include white grains for the Shaba and the Kasai Oriental regions and yellow grains for the Bandundu and the Bas Zaire regions. The hard-textured flint-dents are generally preferred because they have a higher level of storage insect resistance and are relatively easier to transport except for the Bas Zaire region where the softer-textured dents are usually preferred for making flour. Insect considerations center mostly around the leaf-hopper because of its role in transmitting the streak virus. It is expected that downy mildew will gradually receive greater attention because of its importance in Central Shaba and also stalk and ear rots because of their presence in the Bandundu and Bas Zaire regions. Among the insects that will become more important in the research efforts at PNM are the maize stalk borers and the maize storage insects.

Some windscreen surveys and a major exploratory survey of some villages were conducted at PNM. In a way, it can be said that many of the selection criteria have already been validated by the farmers. Based on the answers received from the farmer on the occasion of the exploratory surveys, there are five major constraints to small farmers increased maize production: poor soil fertility, streak virus disease, maize borers, lack of imputs (particularly seeds and fertilizers) and insects in general. No attempt has been made to discuss with the farmers about their farming systems in order to understand and then prioritize these constraints. Take the streak virus disease constraint for example. Field observations will show that this disease is particularly associated with late planting, which could be the result of many factors such as labor shortages or farmer strategy to avoid crop failure use to poor rainfall distribution. Is this because at that time it is more likely to find a greater concentration of leaf-hoppers as a result of these progressive build-ups of their populations during the first months of the season? In this case, would it be easier and less costly to have the farmers concentrate their planting dates in order to shorten this wide spread planting period, which is a major part of the problem instead of breeding for streak virus resistant maize? Or would it be wiser to work on both avenues since the spreading of the planting dates within a small production region is bound to cause some disease or insect problems anyway, if it is not streak virus because of introduced resistance, it will certainly be another pest or disease. What

would it take to achieve the goal of reducing progressively the duration of the planting dates in a maize producing area?

B. Breeding programs

The PNM breeding programs are sound and responsive to farmers needs since they are addressing farmer-identified constraints to increasing maize production, However, they can be and are being improved. The new techniques for increasing disease pressure in the selection plots will certainly lead to an improvement in the quality of the trial results and consequently a greater precision and a better chance for success in the breeding programs. However, the approach that consists in building up the leaf-hopper population in breeding materials for streak virus should be used if at all only under tightly controlled conditions in order to avoid increasing the natural threshold of both the leafhopper and the streak virus populations in surrounding areas. This approach calls for the use of growth chambers for both the rearing of the leafhoppers and the subsequent breeding work. It would also be very useful to study the possibility of biologically controlling the leafhopper population. It should be noted that the two populations, the leafhoppers and the streak virus, are probably presently at equilibrium and that increases produced in the leafhopper population could very likely result in a greater incidence of streak virus.

The support of the phytopathology section in the breeding program is adequate but, in comparison, the support received from the entomology section can be greatly improved in particular as it relates to the research efforts on corn borers.

In terms of selection methods and more specifically the use of mass selection in the corn breeding programs, very little can be said that the PNM maize breeder does not already know. It might be useful to recall only that mass selection is usually more successful for traits that have high heritability i.e. traits whose phenotypic expression (what is seen or easily measured) is closely related to their genotypic constitution (the genes they carry). In general, environmental effects are relatively much less important for these traits than genetic effects. The present research activities being carried out in the PNM breeding section under the heading of a comparison of selection methods do not constitute a study per se. Instead, as far as it can be determined from a relatively short visit with the breeder, it is a proposed comparison of the results to be obtained with different breeding methods (recurrent selection) that are being used on the same or closely related breeding materials. Without contemplating the comparison these various selections schemes could have been used anyway. Besides, these research activities could prove indeed very useful, in particular to Ph.D student, who would find these breeding materials already prepared for him to use in his thesis

work. The project is about applied and adaptive research. The activities just discussed fall under applied research, i.e. the developpment or testing of a methodology or a variety for later use in determining the usefulness or possible adaptation of the results in the farmers living/farming environments.

Most of the selection methods being compared belong to the category of intra-population improvement methods which are usually quite successful in the development of open-pollinated varieties. A good presentation of these methods can be found in the fifteenth Chapter of Volume I, Principles of Cultivar Development. Theory and Techniques by Walter R. Fehr, 1987, published by MacMillan Publishing Company.

The specific issue of development of corn hybrids for farmer use should be seen almost exactly as that of making expensive recommendations to the farmer. It is not a technical issue per se when the necessary technology is already available. It is instead an economic issue. Some recommendations cost more than others. Some farmers can afford them, most cannot. A maize breeder who is working in the interest of farmers who cannot buy seeds every year should not concentrate his efforts on hybrid seed production. However, outstanding hybrid coordinations identified during the breeding process should be recorded and seeds conserved for eventual use in economic studies and release to interested farmers, private organizations and research institutions. A hybrid, like a high fertilizer rate, is a recommendation that could be of benefit to some farmers. The proportion of such farmers in the client population and the overall benefit to all concerned should help determine the proper place of hybrid development in the breeding program. At PNM most research efforts are presently geared toward obtaining open-
pollinated maize varieties with good yield potential, adapted to local conditions and resentment or tolerant to streak virus and leaf blight.

3. PNL

A. Selection criteria

The selection criteria for all four grain legumes of the PNL breeding programs are right on target for addressing the farmers constraints to increasing production and improving the breeding material for these crops. This is undoubtedly the result of several factors, not the least of which are the accrued benefits of the recent short-term consultancies and the insights gained from the more in-depth surveys PNL has conducted in comparison to the much simpler surveys undertaken so far in the other two programs.

B. Beans

For the common beans, there is a general objective of identifying or developing disease resistant (Bacteris and maladie de la tocle) varieties with high and stable yield for the various ecologies of low, medium and high altitudes. There are also three more specific breeding objectives: to obtain disease-resistant indeterminate-growth type varieties with high and stable yield for use in intercropping with maize, to breed drought tolerant varieties and to seek composites or variety-mixtures for the specific high-altitude bean-producing areas where variety mixtures are commonly used.

Beans are often attacked by numerous insects particularly at the end of the season and often as a result of late planting. No mention is made of a breeding activity to address this problem. Entomological research has already begun at PNM on one of such insects, the beetle Ootheca bennigseni. Insects are so conspicuous on bean fields on and off station that breeding work should probably be carried out with and without the use of insecticides in order to assess general level of tolerance of the breeding materials. There is also a need to study the specific complementary role in insect control played by each variety used in the farmers' variety-mixtures. These mixtures do not have a constant composition, so a fairly large number of samples would need to be included in these studies.

C. Groundnuts

Groundnut selection criteria include obtaining early-maturing Valencia and Spanish varieties that are tolerant or resistant to cercosporiose and rosette and adapted to soils of low or average fertility. Conversely, the selection criteria for the Virginia type call for late or medium-late varieties that are tolerant or resistant to rosette and cercosporiose and adapted to conditions of high or average soil fertility. These criteria are dictated by the prevailing living farming conditions in the areas where these different types of groundnuts are grown. In addition to these general selection criteria, the groundnut breeding section pays close attention to the need for adaptation to inter-cropping which will probably translate into some preference to be given to the more erect types of groundnuts as opposed to the more spreading types that usually lead to lower total yield in an intercrop system.

Progress in these selection criteria will undoubtedly lead to greater yield and production of groundnut for the small farmer. However, since all these objectives cannot be met at the same time, there is definitely an important need to prioritize the constraints to farmers for increased groundnut production. An important survey is being prepared at PNL. It would be useful to include in this

survey the collection of data or information which could help in determining the priority given by farmers to these various constraints to increasing groundnut production; which of these constraints are being addressed successfully by the farmer; and which are presently causing greater yield losses to the farmer.

D. Cowpeas

Selection criteria for cowpea breeding are simply to seek early or medium-maturity varieties with high yield and acceptable level of insect tolerance or resistance. In addition, the cowpea selection section would like to increase the genetic variability in their breeding materials and pay special attention to obtaining cowpea varieties adapted to intercropping with cassava and maize. Diseases such as "maladie de la toile" found on beans are also present in cowpea fields. Although not often mentioned, disease consideration is also important in the present cowpea breeding program. The local variety Muyaya is not a high yielder but looks like a well adapted variety and an important source of genes for resistance to both insects and diseases. It should be used as parent in the crossing program of this section.

E. Soybeans

Selection criteria for soybean breeding are as few as those for cowpea. Perhaps this is because the problems of these two crops are not well known yet or the present local varieties have a sufficiently high level of adaptation to the prevailing growing conditions for these crops. Soybean selection concerns obtaining early, late or medium-maturity non-dehiscent varieties that would nodulate under natural conditions. Consideration is also given to soybean types that could be intercropped with other species like maize for example. Soybean research has received varied emphasis in the PNL breeding programs in recent past for various reasons. However, soybean is presently an important crop in Zaire. Soybeans are being used by the farmers, and even preferred for certain specific uses such as soybean milk and soybean biscuit, and there is certainly a market for soybeans that needs to be further developped and organized. Soybean production has the fewest problems among the four grain legumes with which PNL works. Progress in increasing soybean production can be made much more easily, given the breeding material already at the disposal of the soybean breeding section of PNL. Therefore, it would be a mistake not to take full advantage of all these favorable circumstances.

F. PNL breeding programs

All four breeding programs at PNL are completely sound and responsive to farmers' needs. However, there is no need at this time to have four distinct programs. The approaches followed in

these breeding programs are the same and should vary only with the mode of inheritance of the traits under consideration. These are primarily self-fertilized crops. Any one of the breeders can work interchangeably with any of these crops. At the same time, observations made in the field show that the agronomy work on these crops is much neglected. Planting dates, rotation and intercropping are all areas that need attention now. It would indeed be useful if these four different breeding sections were regrouped immediately to form two breeding sections one for Bean/Cowpea and the other for Peanut/Soybean. The two groups of personnel newly disengaged from the two merged breeding sections could be used to form an agronomy section for these four crops.

Agronomy, Plant Pathology and Entomology Research Activities

Manyagronomic trials have been conducted in all three research programs, particularly in intercropping and alley cropping withe the legumivous trees Leucaena leucocephala Cassia floubunda. However these should be seen as isolated, although useful, research activities. The FSR integration of these activities has not taken place. The actual usefelness including the technical feasibility and economic value of these practices taken globally inside the existing or proposed farming systems is yet to be determined.

Likewise, research activities are underway in both the entomology and plant pathology sections of the three research programs. Very useful information has been published. New field inoculation techniques have been developped. Breeding activities have benefited from these developments. Much improvement is needed however if the objectives of the project arte to be met. The primary roles of these disciplines at this point should be to support the breeding and agronomy research activities. There must be a concentration of efforts from all disciplines to integrate the agronomy and breeding research results with farming systems research and make some recommendations for improved farming systems to the farmers as soon as possible. The attempt at PNM to determine the level of acceptance by the farmers of the PNM recommended practices is a step in the right direction. But, given that the actual farming systems are not yet identified, this information cannot be fully understood and used. for example, the results say what percentage of farmers use a particular recommended practice. what is needed, is what are the farming systems in which this recommended practice is used, why, how is it used and what are the consequences or results of its use. this practice is going to be appreciated by the farmers primarily on those bases. Therefore the researchers should know in advance those bases or conditions in order to establish the likely criteria for acceptance of this practice and other sets of practices being prepared for extension to the farmers. All the information should be made available to the outreach personnel in time to make recommendations to the extensino organizations. Because the considerable lag in preparing

these recommendations packages by the other research disciplines, in particular FSR, outreach personnel has had t deliver to the extension oprganizations what amounts so far to commodity-oriented recommendatinos instead of user or beneficiary-oriented sets of recommendations as prescribed and required by the dictat of this project. This situatin can and should be corrected as soon as possible.

Soil Science

Soil fertility is identified in the project paper as a major constraint to increasng small farmer food productin in many parts of the project implementation area. This is a result of both the cropping and farming systems that are being used by the farmers. So, here also, the prior field work of farming systems research is needed in order to identify the major constraints to increasing food production and further rauk soil fertility in comparison with the other constraints. The basic field work should help answering important questions such as: how specific should fertilizer recommendations be? How economical could these recommendations be? The answers to these and other soil related questions depend on how variable are the main soil types, what are the characteristics, what are the nutrient requirements of the main cropping systems, what is the availability and over-all costs of delivered fertilizers in the localities located in the project implementation area etc. Some significant work has been done in the project, in particular in nutrient deficiency identification, but again, the over-all integration of these activities is lacking. It is important to note that the usefulness or true value to the project of the soil mapping and classification unit depends also on this initial basic field work of FSR. If ths soil types were to be closely related and soil management practices tyrn out to be very similar across farming systems then this unit would probably be less important. If, on the other hand, as is probably the case given the vastness of the area covered by the project, soil types are very different and soil management practices variable with farming systems used, then the soil mapping and classification unit will turn out to be one of the most useful center of activities of the project. Its expected benefits would be both considerable and lasting. Contrarily to all expections, this unit is not yet in place. Its location and functions should be given careful consideration.

Discussion

According to the project paper, this project should contain six major components: (1) genetic improvement of crops; (2) improvement of agronomic practices; (3) farming systems research; (4) soil fertility research; (5) outreach, and (6) organization. the sixth component was in fact a commissioned study by ISNAR for an appropriate institutionalization of agricultural research in Zaire.

The following table show the objectives set for the other five components:

	Project Components	Focus and Objectives
1.	Crop genetic improvement:	Improved varieties of cassava, maize, bean, soybean and goundnut.
2.	Improvement of agronomic practices:	Improved cultural practices: dates of planting, plant densities, weed control, rotations, fertilizer use and cultivation practices.
3.	FSR:	Socio-economic agronomic studies aimed at better understanding of farming - living conditions and cnstraints to more productive farming systems and practices
4.	Soil fertility research:	Establishment of continuous cropping systems to reduce labor requirement and maintain soil fertility, soil mapping and classificatino unit staffed by Zairian soil scientists with the benefit of short-term consultancy
5.	Outreach:	Intermediary or link between research and governmental and non-governmental organizations involved in extension.

The project paper futher indicates the roles of the components to each other. FSR would play what would comeout to a elad role in guiding research to topics most relevant to farmers needs. Research itself would take those guidelines into consideration in identifying or developing better food crop varieties and cultural practices (plant breeding and agronomy). The results of these research activities were to be combined into more productive cropping and farming systems with the use of such techniques as intercropping, alley cropping and managed/allow systems that allow the farmer to reduce labor requirement while increasing or monitoring soil fertility. These new or improved systems would then be taken to the governmental and non-governmental organizations for extension to farmers or farmer groups.

This scenario of project activities is sound, can and will work if first it is executed in the prescribed logical order and the four

components except FSR would pass through a preparating phase while FSR gets to work to identify the prevailing living/farming systems iin the project area their constraints and limitations and their opportunities for improvement.

In this preparation phase: the plant breeders would establish the main characteristics and requirements of the available varieties both local and improved, the agronomist will determine the objectives, characteristics and result of the actual cultural practices for the major cropping systems practices in the project area. The soil scientist will begin preparation and execution for the identification of the major soil types in the project area and would also prepare recommendations for their proper use depending on these soil characteristics and the main crop requirements. The outreach specialist will make an inventory of all organizations involved in agricultural extension in the project area, with their mandate, their source of financing, their plan and mode of operation and the result obtained so far.

It is obvious from the preceding that agronomic research was designed to be as or more important than breeding research in the project. Results to date suggest that the exact opposite has taken place. Given the advances already realized in the breeding sections, it is suggested that in coming years, more emphasis be given t the project agronomic research activities in the following manner. The breeders should determine the responses of the local and improved cultivars to fertilizer use (with participation of soil scientist) and dates of planting in their intended areas of diffusion. The plant pathologist and entomologist will study the incidence of major disease and insect pests in those trials. Altogether, breeder, plant pathologists and entomologists (and eventually plant physiologists) will make joint recommendations (variety and cultural practices) to the agronomist for use in crop rotation, intercropping, alley cropping and relay cropping trails, to be conducted in collaboration with the soil scientist. The agronomist will also study other important cultural practices such as land and soil preparation, weeding and weed control, and harvest and post-harvest crop handling. It is conceivable that under actual productin conditions of fresh maize in south Shaba and cassava in Bas Zaire, food quality of these crops is being influenced by harvest time. The agronomist with the technical help of a food technologist should establish or disprove this possibility. Finally, the agronomist in close collaboration with the agricultural agronomist will determine the economic implication of each recommendation packages so as to properly advise the farmers on possible improvement of their farming systems. Identified groups of farmers and farming systems should be targeted for appropriate intervention and improvement. The characteristics of these farming systems including both constraints and advantages should be well known in advance so that the results of their functioning (operation) after accepting and implementing the recommended sets of improved technologies can be fairly well

predicted. The rural sociologist will join in to make those predictions on the basis of the previously made analysis of the socio-economic variable or features of the client or target population.

The agronomist should then make a work plan similar to the selection plan of the breeder showing in chronological order the various trials or interventions planned for each important cropping system. This is one way that he will acquire the necessary importance and play the critical role so vital to the attainment of the objectives of this project.

Care should be taken to avoid duplication of agronomic research in the various programs and also unnecessary repetitions of previously conducted agronomic trials.

It is recommended that the next two years should be used to prepare for phase II of the project. The actions suggested below will help improve Project Performance in the remaining two years as well as lay the ground work for the next phase.

1. Make an exhaustive inventory of on-the-shelf technologies and screen those under farmers conditions.

2. Develop an overall research strategy for the RAV crops taking into consideration known constraints to increased productivity and production.

3. Develop a detailed research program and work plans to implement the approved research strategy during the remaining two years of the project.

4. Strengthen the training of research personnel in the concept of farming systems approach to research so that all those concerned have the same view of what is going to be done in the implementation of this project.

5. Strengthen the agronomic research component in all the three programs to focussing on soil fertility, intercropping and cultural practices.

4. General Technical issues for all breeding programs

A. Use of insecticide as a potential means to generate insect resistance

This particular use of insecticide could be conceived only for controlling a predator or a parasitoid in order to free temporarily the insect crop pest and allow it to build up its population so as to increase selection pressure in a breeding material. As mentioned before in the case of maize leafhopper, this situation

calls for a very controlled environment like the use of a growth chamber or similar outfit for preventing the increase in the insect population in the surrounding natural environment. The decision should be made on the basis of the level of certainty that can be reached in actuality in predicting that the situation is not going to get out of control. Given the precarious conditions in which the IITA entomologist is presently working, this cannot be determined at this time with any degree of accuracy. The other possible interpretation of this issue is the sudden expression of resistance to a particular class of insecticides by the insect those insecticides have been used against. This can ony happen through gene mutation in that insect and after a prolonged heavy use of those insecticides. This possibility has a very remote chance of occuring under actual research conditions in the projects.

B. Use of fertilizer at the farm level testing/extension phase

Farmers use fertilizers discriminately on their crops. Sometimes it is on the basis of anticipated returns, other times it is because of the preference accorded to certain crops. Therefore, a breeder should use the actual reason as a first guideline in deciding whether to use fertilizer in selection trials or not. However, two more critical factors should also be considered because of their importance to the over-all goal of obtaining successful varieties in a breeding program. First, it is known that gene expression is in general greater, that is, greater phenotypic expression of genetic combinations is obtained, under conditions of higher soil fertility than under conditions of lower soil fertility. The breeder is able to identify better the superior genotypes under conditions of high soil fertility. Secondly, before going to the farmers fields it is important to know in advance the response of the improved varieties under conditions of both low and high soil fertility. It is not in the farmers fields that a breeder should learn this important fact for the first time. Based on these two considerations alone, breeder must work under the conditions of both low and high soil fertility and if the soil being used is not naturally fertile, a locally available chemical fertilizer should be used. At the farm level testing/extension phase, wherever fertilizer is available to the farmer and its use is known to be profitable, then it is important to use it in the trials. This option should also be presented to the farmer for his own consideration. Judicious fertilizer recommendation should be based on reliable information usually obtained through appropriate plant and soil analyses. When the chemical elements needed are known, through easily identifiable deficiency symptons for example, fertilizer doses to be recommended could be established with the use of control varieties whose levels of response to these soil nutrients are already known.

A more basic and controversial issue is raised with this factor. Implicit in this discussion is the consideration as to when to

recommend a particular technology to a farmer, a new improved variety or a new set of improved cultural practices. It is important to realize that the final result is not always the same and often depends on which is presented and accepted first. A farmer who accepts an improved variety, because it produces better with his own cultural practices may not be enthused to seek improvement in those cultural practices, particularly if this entails additional costs to him. Also, this variety may never approximate its full yield potential under those conditions. Of course, this needs to be determined in each case. Conversely, if a farmer is first presented with and accepts a new set of cultural practices, the question is: would he later consider using an improved variety and discontinue growing his own variety? Again each case should be approached based on the actual facts involved. This basic question is raised here in order to show that indeed many other factors need to be considered in order to make the best or most appropriate decision according to the facts of the case. Taste preference, economics and farmer receptivity are often the key considerations that allow the researcher to reach the best compromise for the farmer's benefit in those circumstances.

C. Use of antennes or intermediary stations as opposed to on-farm testing

There is certainly a need to involve the client farmer early in the selection process particularly when the crop is used for food. However, it is ill-advised to go to the farmer with early-generation, segregating materials. Instead, the participation of the farmer should be sought only when the material is near fixation, i.e. its genetic integrity is already determined.

The antennes or intermediary stations should be used primarily for two purposes, first to incease the number of testing sites with the objective in mind of reducing testing years, but the sites should truly represent different environments; and secondly to submit the breeding materials to known disease and insect pressure present or distributed in those sites. Thus the breeder can evaluate both yield stability and environmental adaptation in the material. Specific adaptation or general adaptation will be so identified. The farmers do not usually participate in these trials. In general, two or three years suffice for most crops if the number of testing sites is enough e.g. four or more.

Farmers fields are used in a breeding program with an FSR approach in two main ways and for two sets of complementary reasons. The trials on farmers fields are either farmer-managed or researcher-managed. In general the researcher-managed trials should precede the farmer-managed trials.

The research-managed trial is in fact a tacit test of acceptance by the local farmers. Although it is never called that it is in

reality a demonstration, either of results or of methods. That's what it ends up being and the researcher is better off not seeing it in any other way. When the researcher places a trial in a farmer's field, the trial will be visited by the farmers, questions will be asked, remarks will be made and conclusions will be reached exactly as if it were a demonstration plot. Knowing this in advance the researcher should prepare his trial very carefully; precede it by a survey of the factors that will affect its outcome in that particular location; follow it closely; and be prepared to share the results with the local farmers. The primary expected result should be: to convey to the farmer the view that he can do it too.

The farmer-managed trial should follow the researcher-managed trial in the farmers fields. It is a much simpler trial. Its purpose is to prove the point earlier made: you also can do it. This trial is often an agronomic comparison involving the farmer's variety and cultural practices and the recommended variety and cultural practices. Effort should be made to include all four treatment combinations in order to be able to discuss fully all possible economic options and advise the farmer accordingly. Usually one or two years of farmer-managed trials are enough whereas only one year of a successful researcher-managed on-farm trial suffices to capture the farmers' attention.

D. Need for and type of seed quality standards needed

The quality of the seeds used usually by farmers in developing countries is generally low. They prepare their own seeds and conservation conditions are in general inadequate. There are variations however and consequently seeds are better conserved in some places than in others. There is a need therefore to know very well your client farmers on this matter. A breeder must know how good are the seeds that the farmers use, how well they conserve them and what factors are involved.

This information should be taken as a first indication of the seed quality farmers are likely to accept. A farmer compensates for low quality seeds by sowing a comparatively high quantity. He expects a low germination rate and he does not consider the cost too high so as to force him to use the seeds more sparingly. In many places, the farmer might even fail to thin the population after emergence. The question is often asked: would he do that if he had to buy the seeds? The answer is yes. At least at the beginning and until he learns that he can trust the germination power of those seeds and save money.

The plant breeder needs to maintain the integrity of his own breeder seeds at the highest level possible. This could go as high as available resources permit. The longer seeds have to be conserved, the lower seed temperature and humidity have to be

TABLE 1: CULTIVAR DEVELOPMENT TO DATE

REGION	IN USE OR READY FOR FARMER USE	IN FINAL STAGE OF SELECTION*
Bas Zaire	**Cassava:** Kinuani, F100 **Maize:** Kasai I	**Cassava:** 83/137, 83/214, 83/138 83/584, 40230/3 **Maize:** TZB-SR,EV8443-SR, 8505-3(hybrid) **Groundnut:** AE4/2, ICGS(E)-119 **Bean:** Black Dessie, G2816, Carioca, ZAA
Bandundu	**Cassava:** F100 **Maize:** Bandundu **Groundnut:** JL24, A1052	**Cassava:** 82/320, 82/287, 82/035 **Maize:** IK83TZSR-Y 8644-31(hybrid) **Groundnut:** AE4/2,ICGS(E)-27, ICGS(E)-22, ICGS(E)-19
Kasai	**Cassava:** Tshilobo or 30085/28/10, 60882/10 **Maize:** Kasai I, Salongo II **Groundnut:** A65, G17 **Cowpea:** Muyaya	**Cassava:** F100, Mubalamata or 4(2)0426/1 **Maize:** DMR-ESR-W, 8321-18(hybrid) **Groundnut:** (CG)S-50, ICGS(E)-114 A1208/2, JL12, ICGS(E)-18, FDRS- **Cowpea:** H4, H36, H204 **Bean:** RAB251, RA029, A21 **Soja:** TGX814-27D, TGX573-209D TGX849-294D, IAC73-5115 TGX814-26D, TGX814-49D
Shaba	**Maize:** Shaba I, PNM I **Groundnut:** A65	**Cassava:** F100, 30085/28/10, 60882/10 **Maize:** Babungo 3 (83) TZMSR-W, 8321-21 (hybrid) **Groundnut:** JL24, ICGS(E)-34 **Bean:** 6 varieties for North Shaba, 11 varieties for S. Central Shaba **Soja:** same 6 varieties for Kasai
Kivu		**Cassava:** PM055/69, PM009/69 **Bean:** Nakaja, Naine de Kyondo, Kirundo, Puebla Criolla, G2331, G2333 **Soja:** Oribi, Sable
Haut Zaire		**Cassava:** 30572/149

* These varieties present, in general, an average yield advantage of 20-30% ove the local or improved varieties that they will replace, as well as some highe level of adaptation to local production conditions, usually in the form of highe disease tolerance or resistance.

Source: RAV/Coordination. 1988 Progress report to USAID Project Officer September 23, 1988 and Personal Communication from project plant breeders

maintained and the more expensive the equipment and facilities that need to be used. Also, when reproductions of the breeder and foundation seed stocks are made regularly, less is the need for such expensive equipment and facilities. The costs could be limited almost entirely to what is necessary for the breeder to conserve his own seeds. A duration of five years is in generally adequate. This is not the same as for a seed conservation outfit where a conservation time of 20 years might be seen as a minimum.

The standards being used in the breeding programs are acceptable for direct farmer use. Care should be taken however to avoid preparing seeds for distribution on a year to year basis. This is dangerous, because in the case of any failure to obtain quality seeds, either there would be no seed distribution that year or low quality seeds might reach the hands of the farmers. Instead it is preferable to prepare seeds for distribution on a two-year basis, thus allowing enough time to correct a mistake that could have been committed in the process. Minimum standards of 90% germination rate and 95% seed purity should be maintained for all crops and standards should be higher for seed companies and for hybrids, perhaps 95% and 98-99% respectively. Adequate facilities such as laboratory space with controlled temperature and moisture are needed in order to reach and keep these standards in seed production, conservation and distribution. However, this is not a critical issue for the time being, for these standards are much higher than those the local farmers are accustomed to.

Foundation Seed multiplication and distribution can be a lucrative activity for well trained and educated farmers. The project could consider training some farmers this line of business and then monitor their progress so to be able to apply necessary corrections when and where needed. Seed conservation, however, should be handled preferably by a national institution since germplasm banks should be seen as very valuable national resources. The creation and maintenance of such germplasm banks could be a prt of the long-term goal of the project of building a sustainable research institution in Zaire.

E. Use of crop rotation, other soil fertility practices and water utilization at the station level

Rotation between crops botanically distant on a research station is essential in order to maintain plant diseases and insect pests at a manageable level. Many farmers know the value of rotation in this resepct. They also seek the further benefits in soil fertility maintenance and use inherent particularly to the cereal/legumes rotation. A farmer who does not practice this rotation has generally a constraint that keeps him from doing so and that has to be investigated. The need for a breeder to stay away from this very useful practice is not common. It would have to be a very specific requirement of the breeding situation under

consideration. Therefore this case cannot be generalized. In practice, the breeder will need to make the determination to use or not to use crop rotation in his breeding trials on the basis of his breeding objectives and the difference between the field research conditions and the actual field production conditions.

Soil fertility practices constitute a different subject from that of the use of crop rotation in breeding activities. They are also approached differently. In this case the breeder is looking for specific conditions, in which to place the selection trials and he takes the appropriate steps in order to obtain those conditions. For example, if the land available is too rich and the breeding situation calls for the use of a low or medium soil fertility, the breeder might wish to put a crop with no fertilizer on it first, in order to lower the level of nutrients available in the soil and then use it for the selection trials. If, on the contrary, the breeding situation calls for selection work to be carried out under conditions of high soil fertility, the breeder might want to put first a cover crop on the land that he would plow under and/or apply a high rate of a complete fertilizer before planting his breeding materials. These breeding techniques in general concern specific adaptation to a known prevailing condition in the production area which is otherwise difficult to correct. The details of the situation should be well investigated before deciding the proper line of action. Some physiological responses and disease resistance traits are often important aspects of this specific environmental adaptation. In this project, the cassava breeding program might be much more concerned with this issue than the groundnut breeding program, since the vegetative cycle of cassava is much longer than that of groundnut. Only non-availability of fertilizer in a low soil fertility area can lead a groundnut breeder to seek a genotype adapted to low soil fertility. However, this should be seen as a very temporary solution, a first step in seeking to promote changes. For, as it should be expected, performance in a low soil fertility environment will be asociated with a low yield potential, a condition that can hardly be seen as desirable or conducive to a greater incentive for adoption of better performing technology.

The practice of irrigating trial plots on station, in general, is very limited and is reserved for special occasions, such as for saving some important plant materials in the advent of severe drought conditions. This practice was noted at Kaniameshi on some trial plots of PNM. Apparently, it was done because the client farmers themselves do the same under similar conditions. This involves very early planted corn, destined to be harvested and sold as green maize in order to take advantage of a very particular and precise market opportunity. In this case, the practice is totally justified and it was verified that the water is available to both the station and the client farmer and was being used only sparingly.

F. Constraints to increasing on-farm testing

The importance of extensive on-farm testing in this project has already been mentioned. There are no technical constraints to increasing both the number and the scope of these trials. Problems observed in the field are those of difficulty stemming from procurement of vehicles and consequent lack of transportation. The wide geographical distribution of the main project sites also compounds the problem. The major implication of the on-farm trials in the FSR approach being proposed for this project furthers accentuates the need to remove this constraint as soon as possible.

Most farmers in the project area appeared to be receptive, some even eager to participate in the on-farm trials. They can see clearly the numerous benefits both to themselves and to their communities. The researchers themselves are in favor of their use on a regular basis in their research activities. What is often missing is the material means to plan, execute, follow up and evaluate those on-farm trials in sufficiently large enough number to make a visible and lasting difference.

5. Major findings

1. Very useful crop or commodity-oriented agricultural research is being carried out in all three RAV programs. Several improved varieties have been released and further progress can be expected along this line since still better varieties are being prepared for release in the immediate future (See Table 1 on next page).

2. Although much needed, improved cultural practices for most RAV crops are not yet available to the farmers. Instead, general information leaflets on each crop have been assembled and are available in French, presumably for use by the governmental and non-governmental agencies involved in agricultural extension. What is truly needed, is a chronological presentation in local languages of the step-by-step recommendations to the farmer for each of the prevailing farming systems in each agricultural region.

3. Besides the quantifiable type of outputs presented in the project paper, there is a need to include also improved farming systems as attainable project outputs. Once the farming systems practiced by a farmer or a group of farmers are identified, they can be described in details showing clearly their main inputs and outputs and their system of operations. There are usually strong causual relationships between inputs and outputs and between the different components of the system. Assuming that food production and income generation are the main purposes of all of these systems, an effort should be made to further classify them on the basis of their levels of inputs and outputs and specific recommended options presented, showing in detail the possible paths for improvement available to each of them.

Recommendations for improvement in farming systems must cover crop and variety, cultural and management practices.

4. Understanding of the farming system research concept, approach and methodology is generally very poor among project personnel. FSR is seen by some as a cropping systems research, or more precisely research on rotation, alley cropping, intercropping etc. and by others as a continuous use of field surveys to gather socio-economic data, farmer crop or taste preference. This is a very surprising finding for three reasons. First, there is a very good paper on FSR by James Jones presented in the project paper. Most likely it was not read by too many project researchers. Secondly, a fairly good and detailed workplan is also presented in the project paper. It calls for an early mini-survey for testing and verifying the tools or methodology to be used later in some major socio-economic-agronomic surveys or studies in the main project implementations areas. This was to be followed by these major surveys. Thirdly the results of those surveys were to be translated into clear guidelines for making research most relevant to farmers needs. Finally, two FSR/E workshops were held with and for project personnel at the beginning of project implementation.

5. The project is corect in choosing a FSR orientation for agricultural research and can find full justification in the facts that what the farmers need are improved farming systems, and how to provide them is through integrated agricultural research. In the words of Harwood et al*: Crop production research must move increasingly toward becoming a more integrative science, in order to better understand the relationships between all the biological parts that comprise the production systems. Hildebrand and Poey** complete the picture by saying: successful on-farm biologic research programs are dependent upon the professional inputs of agricultural economists, sociologists, anthropologists and extension education specialists. These disciplines, they say, are critical, but research directors and others in authority may need to make sure that they are represented and accepted as full participating members in planning and implementating all programs of work. They also advocate on-farm research activities as a way to establish the much needed relationship between research and extension personnel. All these elements are present in the project: research, FSR and outreach. What was needed and never took place was the elaboration of one single FSR/E program for all of the project with contributing elements from each discipline and program.

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* Harwood, R.R., B.D. Knezek, R.J. Battenfield and J.L. Davidson. 1985 Productions systems. In: Gibbs, M., C. Carlson, Editors. 1985. Crop Productivity-Research Imperatives Revisited, an international conference held at Boyne Highlands Inn, October 13-18, 1985 and Airlie House, December 11-13, 1985

**Hildehand, Peter E. and Federico Poey. 1985. On-farm agronomic trials in FSR/E. Lynne Rienner Publ. 162p.

6. The causes of this failure can be found in both the origin and the conceptual framework of this project. The applied agricultural research and outreach project had its origin in three separate primarily breeding projects that it was supposed to integrate into one single project. The three projects, as already mentioned, were heavily involved with plant breeding, covered three different crops and were located in geographical areas relatively isolated from each other. The physical integration of suych projects eas bound to be extremely difficult. This is further complicated by the very bad conditions of transport. Moreover, a mentioned in the project paper itself, the former three research programs were built and operated according to the DOA policy of implementing research through vertically organized programs. So, conceptually the project calls for horizontal interactions in a system built and operated vertically. Each program evolves independently of each other, to the point of commuting their personnel back and forth from each others main station to do their own research work. The independence of operations does not even stop there. While on assignment, the research personnel from other programs ARE truly treated as a member of a separate organization.

7. The structural organization of each of the programs calls for a minimum of five sections: breeding, phytopathology, entomology, farming systems and outreach, each to be headed by a researcher with a MSc or a Ph.D. So, excluding the program directions and other known important disciplines according to the project paper, there were supposed to be at least 3 researchers with MSc or Ph.D. in each of five disciplines for a total of 15. It is worth noting that the technical assistance team was never designed to cover all those personnel needs, presumably because competent local researchers were supposed to be available for some of these positions. Originally, the project was supposed to provide a technical assistance team that included: two plant breeders, three agronomists, one entomologist, two socio-economists and three outreach specialists. Obviously. there is a discrepancy between the basic organizational chart of each program and the originally proposed technical assistance team. Where are the research sections for the agronomists? Are there three plant pathologists and two entomologists available locally? Assuming that the socio-economists were to be the heads of the FSR sections, that would have meant that one socio-economist was available locally. The situation in the field indicates that none of these assumptions were true.

a. The present organization chart of the programs is inadequate for the attainment of output 1 of the project in particular, namely a coordinated and integrated food crop applied research program with forward and backward linkages to extension and the farmer through the use of FSR approach. It reflects very well the DOA vertical organization and also precludes the integration of all disciplines as called for in the project paper. Evidence exists in the field of section, after section, after section working in

isolation. There is even at places an atmosphere of chasse gardee, or reserved domains. This should not continue.

b. The proposed technical assistance has never been complete at any time during project implementation. This is a bad situation. The technical assistance called for in the project paper was already insufficient, given the goal, purpose and objectives of the project. Appropriate steps should be taken in order to correct this important constraint as soon as possible.

c. The already limited project research personnel are spread too thin. Consequently, the basic disciplines nucleus needed for effective FSR/E does not exist at any of the three programs. This constitutes unfair working conditions for all concerned. Competent researchers are put in situations where they cannot perform properly. Improvement is urgently needed.

d. The geographical spread of a project with limited means has caused numerous problems of communications, unnecessary duplications in efforts to provide each program with adequate facilities, equipment and personnel and has deprived the researchers of much needed technical or scientific interactions.

8. Facilities for library and laboratories for soil and plant analysis, entomology and phytopathology are totally inadequate or non-existent in all the project research stations. For a beginning, they all can be housed in a location central to the project implementation area. But they need to be well equipped and fully staffed so as to become truly useful to project's activities.

H. Critical Constraints

Commodity-oriented research is being carried out at a satisfactory level. Basically, most researchers, local and expatriate have their own research programs they run well with the limited means available to them. Outputs from these programs will always be welcome by the farmers, who have generally very many needs. Some of the farmers' problems are known by the researchers as well as many of the crops problems. The farmers are not at the beginning, the center and the end of the research activities. However, this situation can easily be corrected if the following recommendations were accepted and implemented.

Recommendations

1. The basic structural organization at the National program level for the project should be one direction for research management with two main divisions: one for technology development and the other for technology transfer. In the technology development

division are grouped all the breeding sections with the entomology, the phytopathology, the plant physiology and the soil science sections. It should be recalled that only four breeding sections are needed at this time: one for root crops, in particular cassava, one for cereals, i.e. maize, one for bean/cowpea and the other for groundnut/soybean. That would free some research personnel for the agronomy section which should be placed in the technology transfer division. The sections of the technology transfer division needed at this time are: FSR agronomy, agricultural economy, rural sociology and food technology. Provision should be made to include whenever possible animal science in the technology development division and agroforestry, agricultural engineering and a communication specialist in the technology transfer division.

2. FSR activities should take place in selected accessible village chosen primarily for research purposes. Outreach activities will be carried out preferably in a different set of villages chosen on the basis of available infrastructure, in particular, extension organization.

3. The next two years should be used to prepare for phase II of the project:
(a) training all research personnel in FSR concept, approach and methodology with detailed exercises in all four stages of the FSR methodology, so that all those concerned may have the same view about what is going to be done in the implementation of this project;
(b) making an exhaustive inventory of on-the-shelf technology;
(c) conducting rapid reconnaissance surveys to identify and then prioritize all constraints to increasing small farmers production;
(d) developing a research strategy aimed at removing these constraints
(e) and designing a detailed over all workplan for the duration of the project based on the approved research strategy.

4. It is apparent from the field that many if not all of the USAID financed projects have complementary objectives. They could be located geographically so as to benefit from each other.

ANNEX 5

FSR COMPONENT

SUMMARY

FSR in the Applied Agricultural Research project has not had the impact on research that was hoped for in the Project Paper annex E-3. One reason may be that RAV, in association with IITA, decided to outline their own program of FSR. Although slightly different the approach is still a valid one. The RAV approach was presented in a paper by Dr. Lutaladio at the FSR seminar held in Lubumbashi from January 19-31, 1987. FSR has not been integrated well into either PRONAM or PNM but has been employed at PNL. Having FSR sections and teams was in itself harmful to a Farming Systems approach. All of the researchers should have been involved and each researcher should have carried out his on-farm trials with participating farmers. PRONAM and PNM were well established research organizations before RAV's involvement and had previously set research priorities, making it difficult to integrate FSR into the existing program when researchers felt they already knew farmers' production constraints. Multi-disciplinary research is as described in the Project Paper is not apparent in either M'Vuasi or Kisanga. PNL has made more progress than the other two programs in identifying and acting on farmers' constraints by tailoring research and on-farm trials to address the problems they have identified.

All of the researchers have been working under various levels of professional constraints. A constant lack of vehicles and finances since 1986 has plagued the project at every level. Qualified personnel are leaving the project from frustration and lack of resources. Access to scientific equipment, journals and other publications has hampered research progress. Gandajika's isolation adds family stress to the problems facing scientists in the other two programs.

RAV should consider allowing outreach to provide feedback to researchers, conduct on-farm trials with researchers and help with survey work in the field. This would mean restructuring the different sections at each of the National Programs so that FSR sections as such should be merged with outreach to form a new division called technology transfer and evaluation. An economist should concentrate on establishing economic impact data for the project. The economist could be stationed in Kinshasa who would organize studies for all three National Programs and carry out field work with each individual program if individual economists are not available for each program. The National Programs then have two sections; technology development and technology transfer and evaluation with a free exchange of personnel between the two. Project activities would be matrix based and planned by project, much like the budget approach initiated last year.

One way to save resources would be for RAV to consider merging two of the programs, PNL and PNM and use Gandajika only as an antenna station.

I. INTRODUCTION

The Farming Systems Research component of this evaluation is reported by National Program due to the degree of differences experienced in understanding of the Farming Systems approach, implementation of the project paper recommendations and how the Farming Systems approach has directed and affected the results of research and the overall project to date. It does not attempt to describe each National Program area's farming systems types but does attempt to comment on how well the FSR component of each program has accomplished that aspect of their program. The base for the evaluation is the reporter's concept of a Farming System's approach and input from the field which is used to form the evaluator's opinions on the project's progress in accomplishing the goals set forth in the Project Paper. Constraints to progress are examined, conclusions are reported and recommendations are suggested.

The main body of the project paper outlines several very different definitions of Farming Systems approaches with everything from "cropping systems" to "cropping systems within a farming systems framework". All in all the main body of the paper was rather confusing when trying to define the Farming Systems approach to be used. Annex E-3, however, presents a very clear explanation of the Farming Systems Research component of the RAV project (pp. 9-13). Dr. Jones delineates an articulate Farming Systems approach which highlights the need for a multi-disciplinary effort guided towards identifying farmers' constraints and involving them in agricultural research. The Farming System's approach used to evaluate this project is the same as Dr. Jones with one minor addition. Constraints identified within a Farming System may not be addressable with the resources available. Thus considering RAV's mandate we should describe the Farming Systems approach of this project as a multi-disciplinary effort guided towards identifying farmers' constraints and involving them in research designed to alleviate the identified constraints which are within researchers' possibilities. Constraints may be identified which are outside the scope of the project and cannot be addressed. These constraints should be noted and considered when designing research efforts and when working with outreach collaborators but priority must be placed on addressable constraints.

The majority of researchers in the RAV project are hindered in the Farming Systems mechanism and the constraints that they are able to address by being tied to principally one of the major food crops, PRONAM for cassava, PNM for maize and

PNL for legumes. Although in theory each crop is being researched on all three major stations and two minor ones the host station's crops do take priority and only selection and multi-locational testing are being done for the other crops.

There is a very fine line between a cropping system, which is where a single commodity based research effort is likely to lead, and a true Farming Systems research approach. A Farming Systems approach would be better served by having all three research efforts working together which, recognizably, in a country as large and diverse as Zaire, cannot be easily accomplished and be able to develop new technologies for such a wide range of climates and food preferences. Researchers must avoid becoming involved in cropping systems research instead of the more total picture of the farming system. PNL has succeeded in following the Farming Systems approach presented by Dr. Jones as closely as possible, PNM is doing a good job and PRONAM is following more of a cropping systems research approach.

One cross-cutting issue on research priorities has been the need for research on new, improved varieties to the which has, it seems, taken more priority that research on improved agronomic practices. Indeed, new or improved varieties can and do increase yields dramatically when responding to specific conditions of disease, drought, or insect pest tolerance. However, the new strains rarely obtain their potential if agronomic practices are not improved in parallel with the introduction of the new varieties. The evaluation team feels that more emphasis on agronomic practices will improve the overall impression of PNM's FSR approach.

Introducing improved agronomic practices is more difficult than introducing new varieties. New breeds require no change in agricultural patterns adopted through generations of farmers. The farmer puts a new type of seed where the old one would have been planted. In some cases, such as early maturing corn varieties, the farmer may plant a bit later but uses the same cultural practices. Introducing a new pattern to cultivation requires a change in ages old tradition and recalls the days of colonialism when farmers were forced to plant cotton in a certain way, on a certain date, use a certain amount of fertilizer etc... or be fined or even put in jail. Although our memory of these events may be short the farmer's is not. Identification of farmers' constraints in a research project as needing new varieties, especially when most of the research staff is hired for that reason, (pathologists, breeders, and entomologists do not normally investigate agronomic practices) is understandable. More of an effort in finding solutions to agronomic practice constraints to production are needed in order to maximize the yields, not only of the local varieties but of the improved varieties as well.

A. Background

The Farming Systems Research component of the RAV project described in the Project Paper by Dr. Jones called for a centrally located unit to be based at the project's administrative headquarters in Kinshasa. IITA Farming Systems consultants visited Zaire in 1985 and argued against this setup, stating that the Farming Systems unit should be at the station level where on farm research could be more easily taken back to researchers and linkages between farmers and researchers could be more easily accomplished. The first project evaluation of 1986 agreed.

Separate Farming Systems units were created for each of the National Programs and located at the central research station for each program; M'Vuasi for PRONAM, Kisanga for PNM and Gandajika for PNL. Scientists and economists began arriving in 1985 for the three Farming Systems units.

RAV adopted its own form of Farming Systems presented by Dr. Lutaladio at the Farming Systems Seminar held in Lubumbashi in Jan. 1987. The approach is much the same as Dr. Jones and calls for strong feedback linkages through extension.

B. Outputs Expected

The project paper does not follow up its definition of a Farming Systems approach with well defined and quantifiable outputs. Section II.F.4 of the PP describes the FSR component's objectives as identifying the "major" constraints and designing approaches for addressing the constraints. "Vigorous" implementation of suggestions for addressing the constraints are to be pursued by project personnel.

Clear quantifiable objectives give good guidance to project personnel and make project monitoring and evaluation (especially internal evaluation) more effective. Milestones increase the prospect of actually obtaining them. "Vigorous" and "major" are not quantifiable, although usually understood.

The PP does clearly state that a diagnostic survey would be carried out by each project to determine the constraints that farmers face to increasing production and that the diagnostic survey would be the base for planning the research effort. Although exploratory surveys have been done at all three stations, only PNL has used their survey to determine their research priorities.

C. Overview of Outputs Achieved

Given the level of staff at M'Vuasi, the working

conditions compared to the other National Programs and the short distance to Kinshasa and the RAV administration one would expect that Farming Systems Research component of PRONAM would have made the most progress. Unfortunately, using Dr. Jones description of FSR this does not appear to be true. The research that is being done is based on constraints identified by researchers. The farmer does not seem to play a significant role in the National Manioc Program's research priorities.

PNM has made more of an effort to identify farmer's constraints to maize production, to try and increase income instead of simply production with early maturing varieties and to develop varieties which are adapted to the farmer's traditional planting season. However, the constraints identified have been those of the researchers and not the farmers. Farmers may agree that disease is a major constraint to production. However, to begin research on this aspect of maize production before the constraint is identified is not a Farming Systems approach. Very little economic data has been recorded concerning how doubling or tripling production will affect the total farm. Maize production, especially through breeding, is the focus of PNM.

PNL, being the youngest of the three National Programs and not having been involved in research until the creation of the program in 1985, has had the best start in using the Farming Systems approach to guide research. At PNL the farmers have been involved in the research effort from the initiation of the program. When soil fertility was identified by the farmers as a major constraint researchers began to work on how to control erosion and improve fertility with leguminous tree crops such as Leucaena and Cassia and intercrop with maize, beans, niebe and soybeans. The farmers' constraints took first priority over what the researchers wanted to do.

II. PRONAM AND FARMING SYSTEMS RESEARCH

A. Approach

PRONAM's approach to Farming Systems Research is a cropping systems approach. Cassava research has been going on since the early 70's and no change has been effected by continuing support from USAID or the introduction into the project's objectives of a Farming Systems Approach. On-farm trials, multi-locational testing and extension are all part of a cropping systems research program and the PRONAM researchers are not implementing this FSR program effectively. Constraints to cassava production are identified by the researchers and the researchers seem to be convinced that they know more than the farmer and can address his problems better than he. For the researchers at PRONAM cassava production is the reason they are

there, not total farm production.

PRONAM's orientation is quite understandable. The organization was born to combat the disease (cassava bacterial blight) that wiped out most of Zaire's cassava production in the early 1970's. Resistance to disease has been the "raison d'etre" for PRONAM and the scientists feel no need to change it to cultural practices or total farm production which may be called for under a Farming Systems approach.

1. Staff perception and understanding

It is difficult to evaluate perceptions and understanding during a two day visit for one can not talk at length with everyone on the station and get a true feeling for how they feel about Farming Systems Research. Researchers at M'Vuasi talk about FSR and they have a section called FSR which does on-farm trials and has done two exploratory surveys. However, no one talked about how he involves the farmers in their research program or how to work together as a multi-disciplinary team. The farmer is used as a partner for "multi-locational" on-farm trials, but not in trying to identify constraints to production.

B. Integration of FSR into the research program

PRONAM uses Farming Systems research as an evaluation tool for feedback on varieties that they have produced rather than as a pointer for the direction that research should be headed. On-farm research is used as multi-locational testing rather than involving farmers in research. A survey by the Farming Systems team in the Kassengulu area was used only to determine the new types of cassava that should be introduced into the area. Although these types of cassava may do very well this is not farming systems based research but cropping systems. The FSR team is being used in the wrong way by PRONAM.

The on-farm trials are conducted well, the farmer is free to choose how and where he wishes to plant the new material. He gives feedback on the variety and tells the researchers what he feels are its strengths and weaknesses. However, the farmers total situation is not brought into the research. On-farm trials are used only to guide the breeders in their own individual efforts.

1. Acceptance by researchers

Over a period of three years PRONAM economists have conducted one exploratory survey in the M'Vuasi area, one in Kassengulu and have written several papers on the subject of

FSR which follow the project paper's philosophy and one would think that the other researchers would have seen the value of the Farming Systems approach.

The exploratory survey in the area of M'Vuasi identified different soil types, apparent systems of agronomic practices, climate, vegetation and various farming systems existing in the area.

Another survey was done in the Kassengulu area which consisted of the same data as the exploratory survey around M'Vuasi.

Although detailed, the exploratory surveys have not been used to direct research efforts. One can argue that it takes 8 years to develop new varieties of cassava using the IITA research protocol employed by PRONAM and so the FSR recommendations have yet to result in new varieties. From the evaluation team's observation this argument is not valid. There was no indication that FSR has had much influence on the direction of research except for reporting on-farm results.

2. Optional mechanisms

Other than a cropping systems approach to research which is where PRONAM is at now, one alternative is to allow outreach to handle on-farm trials and feedback from the farm level concerning constraints and to redesign the FSR section at PRONAM. PRONAM would be comprised of two elements; technology transfer and technology development. Research would comprise the technology development and FSR/Outreach and economics would comprise the technology transfer and evaluation section. Both sections would be directly underr a director of programs who would be responsible of implementation of a matrix approach to accomplishing objectives. Personnel from both sections would, at times, work on projects reather than in sections. This wouls make a better use of time and will help to build a multidisciplinary team. In addition, there should be an economist stationed in Kinshasa who could work out of each of the major stations setting up programs for the collection of impact data; determining the economic importance of the project; and establishing the direction research should take to make the greatest impact on the economy of small farmers. It is late to try to introduce a Farming System approach into the research establishment in M'Vuasi during the present project ending in September, 1990 but the approach can be modified and be in place for a follow-on project. Cassava breeding is an eight year process, the project has two years left so if serious efforts to introduce FSR to determine research in breeding lines were made today one would expect to have some impact on those varieties that are already in the research

chain. Of course, a project extension will allow the process of introducing the Technology Transfer and Evaluation matrix approach and have an effect on the entire research process.

Another alternative is to combine all three National Programs into one location, reduce staff to those who are practicing a Farming Systems approach and develop a centrally located station where both maize and cassava are important, a transition zone location.

C. Linkages of Farming Systems Research and Extension

The FSR team and the outreach section of PRONAM have established some linkages. The outreach section is responsible for multiplying cuttings for on-farm trials by the farming systems section. FSR is responsible for feedback linkages between on-farm trials and outreach and research. The results of the on-farm trials are given to the researchers who then recommend to the outreach section those varieties which they feel should be diffused through the outreach program.

In order to strengthen the outreach program, outreach and collaborating groups' staff and extension personnel should take a more active role in the on-farm trials so that they can observe farmers' cultural practices, reactions to the varieties performance and comparison to traditional varieties. Outreach will be more effective in extending new varieties if they have observed the on-farm trials first hand.

1. Use of Social Scientists

The farming systems section at M'Vuasi employs two agricultural economists, Dr. Nsimba and Dr. Chris Bartlett, an IITA agricultural economist. Dr. Nsimba is the head of the Farming Systems section.

Although there are two agricultural economists on the staff the amount of economic data that have been collected and analyzed for the Farming Systems program does not seem to be voluminous at all. There is very little gender related data, sketchy marketing data and very little consumption information from the field. The collection of economic data should be one aspect of the Farming Systems program at PRONAM that would not need acceptance by the researchers but would be an area that would fall naturally into the economists domain.

The evaluation team was unable to interview Dr. Nsimba as he was not at post. He left on leave and had not returned and had not communicated with the staff in M'Vuasi.

The project also has a sociologist of the A1 level working with the Farming Systems section. His role is to take part in

surveys and to collect on-farm data from farmers about their appreciation of the new varieties of cassava PRONAM asks them to plant.

2. Staffing patterns/alternatives

The FSR section at PRONAM consists of:

2 Economists PhDs
Dr. C. Bartlett (IITA)
Dr. Nsimba

2 Agronomists 1 PhD, 2 AOs
Dr. Osiname (IITA)
Citoyen MAYALA
Citoyen MUAMBA

1 Sociologist
Citoyen KASSONGO

Of the three National Programs the PRONAM FSR team is by far the best staffed in personnel and experience. Dr. Lutaladio's paper on Farming Systems research in the RAV program presented at the RAV/FSR symposium in Lubumbashi in January, 1987 described the minimum FSR team as an economist and an agronomist. Using these standards the FSR team in M'Vuasi should be well equipped to integrate FSR into the PRONAM project.

However, the FSR team seems to be in isolation at M'Vuasi, separate and apart from the research sections. This is felt among the staff of the FSR section. One of the members of the FSR team said,

> The FSR team should have researchers together to make up the team. It should not be a separate set of agronomists who are only responsible for on-farm trials. FSR is multidisciplinary and everyone must agree on what has to happen. Breeders need a lot of information from the farmers in order to develop varieties that the farmer will accept. No one seems to know what the breeding criteria for cassava should be except that it should be resistant to disease and produce more cassava than the indigenous variety.

D. FSR's contribution toward attaining the project's goal

FSR has had very little influence on the research being done in M'Vuasi. The PRONAM project was well under way before an FSR approach was introduced with the RAV project; researchers had already identified what they felt needed to be

done to increase production; and those priorities have remained the same. FSR seems to be tolerated as long as it does not interfere with on-going research.

1. Identified Constraints

PRONAM staff identified several areas where they feel their work has been hindered:

a. Equipment

The lack of vehicles during the last two years has apparently been a major constraint handicapping severely the execution of the FSR program. Having to share vehicles with other staff members limits accessability and curtails trips to villages for survey and economic data collection. On-farm trials can not be visited as often as they should and the area served by the Farming Systems team is reduced substantially by the lack of transportation.

Soil analysis kits were ordered but have not yet arrived. This limits the soil scientists ability to judge soil fertility and macro and micro element contents. Soil structure can still be gauged but nutrient and pH tests cannot be performed.

Computer equipment is lacking in M'Vuasi. It is difficult to analyze statistical data with so many variables with a hand calculator. (Computers have arrived at RAV and are still in the boxes awaiting delivery of transformers. RAV received 110 volt models instead of 220 volt models adapted to the local voltage.)

b. Area

The PRONAM FSR team feels that they have too large an area to cover to be effective, that having Bandundu region as well as Bas Zaire is too much territory. Having just flown over Shaba province in a small plane the evaluator must wonder about this constraint. Although a real one PRONAM should be glad they're not in Gandajika or Shaba.

c. Financial Management

FSR members complained their budget is too small. They are constantly scrounging for funds to be able to make trips into the surrounding villages for survey work. This is a cross-cutting complaint from all three National Programs and all of the sections. A more thourough explanation of this constraints can be found in the Administration and Management appendix of this report.

The evaluation has also identified a few constraints that can be improved immediately and render the program more effective.

III. PNM AND FARMING SYSTEMS RESEARCH

PNM has had more success integrating FSR into its research program than PRONAM. Three factors are responsible for this success: 1) maize research under the CIMMYT program starting in 1972 was already breeding for a number of different conditions giving research a broader base; 2) the presence of a convincing economist; and 3) the shorter time period that it takes to adapt a maize breed than cassava. PNM seems to have a team which works well together and can work in a multi-disciplinary mode.

PNM may simply have hit on more constraints identified by farmers than PRONAM but evidence exists that PNM's research priorities were identified by researchers and not the farmers.

A. Approach

PNM's approach to Farming Systems research has been, on paper, the same as that of PRONAM i.e. identification of farmers' constraints through in depth diagnostic surveys which lead to production oriented research. In reality, research has not been affected by Farming Systems input from the field as much as one would have expected. Any new innovations stemming from the Farming Systems approach were off the shelf varieties which fit nicely into a particular situation identified by the economist, Dr. Vogel. This is not to say that research is not working on serious farm problems in maize production, i.e. development of strains resistant to downy mildew and streak, but the work is not multi-disciplinary. PNM is breeding for problems identified by breeders.

Dr. Vogel, the FSR economist at PNM, and Dr. Hennesey, the entomologist, spent the greater part of the 1986 planting season with farmers in their fields around Lubumbashi. This was the first in-depth gathering of information done but the results have not yet been analyzed. A formal exploratory survey was done in 1987 and a shorter survey was accomplished during the Farming Systems conference held in Lubumbashi in 1987. A windscreen survey was done in March of 1988 and PNM did a survey of one hundred farmers in ten villages in April of 1988. During the first season that there was an economist on the project the on-farm work went fairly well. The FSR section had access to a vehicle and could travel fairly frequently. After the first season and into the second serious vehicle problems cut down the amount of work that could be done in the field. The FSR section was allowed one vehicle with 90,000 kilometers on it.

As with PRONAM one can not be too critical of the cropping systems work that is being produced by PNM. The maize program has

a history of dramatically increasing production through the introduction of new varieties in the late 70's and early 1980's. It is quite possible that the same dramatic increases can be produced by new breeds again. However, new strains are not being studied on how they fit into the total picture of the farm environment, which would be Farming Systems research. If production is doubled or tripled how will that affect the household? Will women have time to prepare food crops, go to the market, get water and do the thousands of other chores she has to do in a day if she is busy harvesting and preparing a doubled crop of corn for her husband to sell? How do agronomic improvements fit into the scheme of production increases? If new varieties are introduced will they ever attain their maximum performance without these practices being improved? These questions should be addressed by the farming systems team to complement the breeding research which is being done at PNM.

1. Staff perception and understanding

As reported after a short IITA consultancy Dr. Joyote Smith's trip report indicates that all the staff at PNM including the Director and the recently returned Mr. Koko, head of the FSR section at PNM, who studied agronomy at the University of Florida, have a good understanding of Farming Systems. Lower level staff and especially the head of outreach did not have any competence in Farming Systems.

B. Integration of FSR into the research program

The reasons for the failure to completely integrate Farming Systems into the PNM program are varied: 1) PNM historically has been a successful program based on breeding. Consequently, breeding is thought to be the most important constraint to production increases; 2) the program itself is in a turmoil with its meager facilities in danger of being taken away; 3) there has been no support for Farming Systems from the Director; and 4) no agronomist was assigned to PNM until early last year when Dr. Berhe arrived.

1. Acceptance by researchers

All of the scientists interviewed accept the value of the Farming Systems approach and that it should be part of their research program. Researchers at PNM that they have identified the farmers' constraints - streak and downy mildew, soil fertility, planting dates and others. While the Farming Systems approach is appreciated, it does not have the priority in their work. One must add that an effective, complete Farming Systems team has only been in operation at PNM for one year. Granted, this has not given the PNM team a lot of time to prepare and execute their program.

2. Optional mechanisms

As with PRONAM one option would be to modify the FSR program in a new technology transfer and evaluation unit and allow it to take over the roles of outreach and FSR such as feedback of constraints and research results and marketing technology. This assumes that more priority will be given to FSR/outreach to allow the feedback mechanisms to be established as no tangible outreach efforts have come out of PNM to date.

A senior economist would be stationed in Kinshasa with assistants in each of the programs responsible for the collection of economic data and impact reporting. The economist would spend equal amounts of time designing programs for commodity based economic research and working in the field with each of the three programs at the six stations, main and antenna.

A second approach would be to merge PNL and PNM work in Kaniameshi. This would solve the problem of isolation for Gandajika, it would lower operating costs and it would introduce improved Farming Systems Research Methodology into the PNM program.

C. Linkages of Farming Systems Research and Extension

No outreach exists in PNM so the linkages between outreach and extension have not developed. The last variety given to outreach for extension was developed under the previous CIMMYT program. Babungo 3 which is IITA material identified as superior by the RAV program for the southern Shaba region is ready for diffusion (see table 1 for comparison data on production of Babungo 3 and other varieties). FSR has been responsible for the on-farm trials of the new strain but outreach has not been involved.

FSR and outreach's closet collaboration is through another USAID project, Central Shaba - 105. Mr. Minh, Central Shaba Project manager, has a major effort going to establish an extension system based on contact farmers and intermediary organizations. This is impressive. He has established extensive on-farm research plots and multiplication fields in Niembo. Project 105's extension program already includes over 850 contact farmers who are using PNM products to increase their maize production. Project 105 is one of RAV's hopes for the future and their ties should be strengthened as much as possible. PNM should consider placing someone within 105, probably in Niembo to help with research trials, demonstration/multiplication plots and training of extension agents.

1. Use of Social Scientists

The only social scientist on the PNM project is Dr. Vogel. He has been underemployed mainly due to a lack of resources. A PhD in

rural sociology is due to return from studying in the United States in December, 1988. He should be assigned to the outreach program immediately and can begin establishing an outreach/data collection/ FSR system at once.

2. Staffing patterns/alternatives

The first team member to arrive was Dr. Vogel, the economist. Dr. Berhe the agronomist did not arrive until late 1986. Citoyen Koko arrived in late 1988 after finishing his studies in the U.S. There are no social scientists (besides the economist) on the FSR staff. The Farming Systems "staff" should, in reality, be the whole PNM research team. By definition the Farming Systems team has to be multi-disciplinary which includes all the skills available to the organization.

The alternative to using the entire research staff as a team identifying constraints and implementing research based on those constraints would be to set up a separate section within the organization which is exactly what was done. The danger is that everyone does not become involved and becomes alienated from the real point of the research.

D. FSR's contribution toward attaining the project's goal

FSR's contribution to attaining the project's goals in terms of identifying constraints to production at the farmer level has been less than hoped for, mainly due to the team only being formed in 1986, a lack of resources, and a number of constraints beyond their control including a lack of equipment and a progressive loss their facilities.

1. Identified Constraints

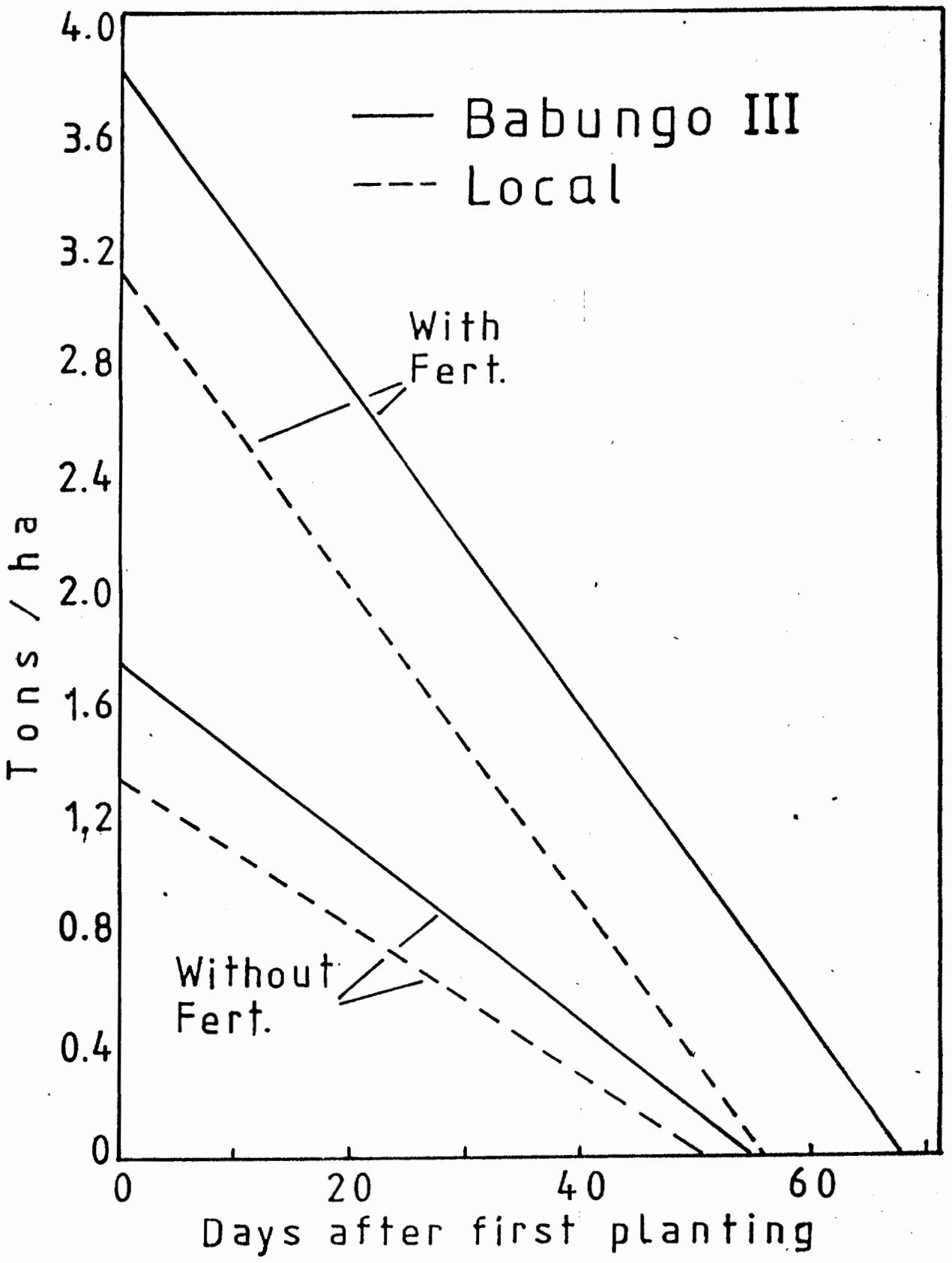
As with the other programs PNM has identified several areas where they feel some improvement may have made or will make a difference in program performance. The major problems identified follow.

a. Financial

Several Farming Systems surveys have been cancelled due to a lack of funds- for per diem, fuel and lack of spares for vehicle repair. The financial problem plagues every sector of this project and has been a never ending complaint during the evaluation. Several studies had to be called off due to a lack of funds including:

Diffusion study
Grain Storage
Quantitative data on inputs

TABLE 1


Babungo III
Local
With Fert.
Without Fert.
Tons / ha
4.0
3.6
3.2
2.8
2.4
2.0
1.6
1,2
0.8
0.4
0
0
20
40
60
Days after first planting

Under the same general heading of financial problems the evaluation was told that FSR does not get any financial or budgetary reports so it has no idea how much they can spend or what has been spent from their sector budgets.

b. Counterparts

The lack of counterparts is a constraint to effective FSR work. Note that at least one counterpart for each scientist is in the U.S. studying for an advanced degree. The problem of counterparts should be resolved with the return of the Zairians presently in training.

c. Vehicles

This general complaint does not need to be highlighted again, it is cross-cutting for all three National Programs.

d. Equipment

There are no laboratories, no adequate office space, no equipment and no library publications. The courage of professionals working under these conditions is admirable but should not be accepted. Researchers must have access to equipment and information in order to do their job correctly.

IV. PNL AND FARMING SYSTEMS RESEARCH

PNL has achieved a degree of success with Farming Systems Research the other two, older programs have not been able to achieve. PNL's FSR is based on farmer identified constraints and is not limited by the expertise of its staff nor by the limited mandate to work on leguminous crops. The success of the program is attributable to two main factors: 1) the program is new having been started in September, 1985 and thus had no preconceived ideas about the direction research should take; and 2) the Director and the head of the Farming Systems section have both adopted the FSR methodology and work on identifying solutions to farmers constraints.

A. Approach

PNL's approach is the same as the other two programs. The difference being that PNL FSR is integrated into all the research. This has been true from the inception of the project. The surveys done by the Farming Systems team have been limited to the immediate area of Gandajika. This has allowed the team to return constantly to follow up on their survey work and to involve the original farmers in the research program through on-farm trials and further feedback.

PNL has selected three areas around the Gandajika station for on-farm work. Each area represents a different soil type indicative of the greater area of Kasai Oriental. The same trials are done in all three areas.

Criteria for research are based on farmers constraints within the scope of the project. Farmers in the areas surrounding all three National Programs have mentioned soil fertility as one of their greatest if not the greatest concern that they have. PNL is the only program in which we saw actual on-farm trials using alley cropping for soil enhancement being performed.

1. Staff perception and understanding

The management of PNL at Gandajika has a good understanding of the Farming Systems approach. Actually, all of the scientists working for RAV are well versed in the approach. The general problem lies in working Farming Systems into the existing research program. Happily, this situation does not exist at PNL.

This evaluator was particularly impressed with the knowledge of Farming Systems shown by the lower level A1 agronomists working on the on-farm trials. They have a very good grasp of the subject.

B. Integration of FSR into the research program

1. Acceptance by researchers

All of the researchers at Gandajika have accepted that the Farming Systems approach is valid and their research has been directed by the best surveys that they could do. The Farming Systems team at PNL has not had an economist yet they PNL has done a good job with Farming Systems research.

2. Optional mechanisms

FSR has worked at PNL. As long as the research underway has been identified using FSR methods there is no real need to change the direction of the research, even if Farming Systems is reorganized into a more economic data collection mechanism rather than just collecting information on production constraints.

An economist, stationed in Kinshasa should be able to spend two weeks every three months at Gandajika and organize a valid economic impact study where assistants do the work, coached by radio contact every day while the economist is elsewhere. Of course this is a hard way to organize a program but it is a viable way where resources are limited and expertise is not readily available.

C. Linkages of Farming Systems Research and Extension

Any outreach efforts done to date by the PNL project have come from the FSR team. PNL has been working directly with two Peace Corps volunteers to help them establish demonstration plots for contact farmers in the Kasai Oriental region. So far they have worked with over 200 contact farmers. The exact number of farmers touched by these efforts has not been estimated but could be as high as 1,000.

No formal linkages exist in PNL between outreach and FSR for the head of the outreach section was only just appointed a short time before the evaluation team's arrival. He has not had time to establish contact with intermediary organizations or conduct any training programs although there are two planned for this coming year. One will be exclusively for Peace Corps volunteers and the other for extension agents from collaborating organizations.

1. Use of Social Scientists

As in PRONAM, PNL has a BSc level sociologist working with the Farming Systems sector in Gandajika. He is the only social scientist working for PNL at this time. A local hire agricultural economist was with the project for a short period of time and left. The only agricultural economist to return from training in the United States and destined to go to Gandajika refused to be posted there and he left the project to take a job with a local bank.

The lack of an economist has seriously hurt PNL's efforts to measure the economic impact that its program has had on farmers in the Gandajika area. There have been no economic surveys done to develop baseline data or for consumption or input studies. If more funds were made available to Dr. Vogel at PNM he could have helped tremendously in setting up a survey which the FSR team at PNL could have carried out with instructions from Vogel by radio or frequent visits. Unfortunately this did not happen.

2. Staffing patterns/alternatives

The Farming Systems staff at Gandajika is composed of;

1 Agronomist PhD
Dr. Shannon (IITA)

1 L2 level Sociologist (eqiv. to an A1 level)
Citoyen Mpoy

1 Agronomist A0 level
Citoyen Kabaluapa

1 Agronomist A1 level
Citoyen Kubenga

The Director, Citoyen Kilumba and a member of the Farming Systems section, plays an important role in on-station research in intercropping and variety trials.

It is worth mentioning again how the lack of any economic data has hurt the PNL project. PNL is the only one of the three National Program with any type of effective Farming Systems research and it is the only one without an economist. It would be interesting to see if the impact PNL is having is greater than the other programs because of the presence of a strong Farming Systems program or if it having about the same or less effect on production.

One alternative to the FSR team staffing would be to combine outreach and FSR and have outreach do the on-farm and multi-locational trials. This is described in more detail in the outreach section of this report.

D. FSR's contribution toward attaining the project's goal

PNL is still a young program from a research point of view. It has not yet developed any cultivars of legumes which have been thoroughly tested on station and on-farm. However, the work that has been done on-farm and on station is research based on the Farming Systems approach. The alley cropping trials underway for soil fertility, the intercropping trials of the Director and the on-farm work with maize and cassava are all done very well. FSR has had a definite impact on PNL and thus will have a positive impact on achieving the project's objectives of production increases through applied research.

1. Identified Constraints

As with the other National Programs PNL staff identified a number of constraints to accomplishing their goals. The most important are listed here.

a. Lack of Input and Information Exchange Among Staff

Heads of section do not have any control over their budgets once submitted to the Program Director. They do not know how much they have at any one time for travel, research, per diem or other expenditures.

Senior researchers do not have regular meetings to plan research or outreach activities despite the fact that they are very short on resources and must coordinate use of vehicles and other equipment. The Director controls all of these activities with little input from staff.

b. Vehicles, Equipment and Lack of Funds

This cross-cutting issue was brought up at every single station that the evaluation team visited. Lack of vehicles and the money to operate them has seriously affected the outcome of this project.

The salaries paid assistant researchers are also very low as in the other National Programs. A good many would leave the project if they had other job possibilities. They have so little money and no transport at noon that they are forced to go without lunch, waiting until five in the afternoon before they can return the nine kilometers from the station to Gandajika where they live. This is the price paid for the isolation of the Gandajika station.

The lack of computers makes analysis of data very difficult.

c. Lack of Contact

Gandajika is an extremely isolated post. Researchers have very little contact with colleagues or other scientists in Zaire or elsewhere by way of professional publications or face to face interchanges. The sheer isolation of the research station also causes stress in families which manifests itself in the work place.

V. CONCLUSIONS

It was never the intention of the researchers at PRONAM or at PNM to exclude Farming Systems research from their programs. Their research was, for the years before the advent of project 091, established as breeding programs for disease resistance and production increases in both cassava and maize. Once the 091 program was underway it could not be easily interjected with a new orientation. This explains why Farming Systems in these two programs is used mainly as an evaluation tool instead of a guide to research , incorporating farmers into the program from the beginning. PNL's success at integrating FSR is due to its youth. The program started on the right track and kept going.

It is not too late for the current project to integrate FSR approaches into all the National Programs as foreseen in the Project Paper. In the two years remaining before the PACD, this newly designated section would be responsible for diagnostic and exploratory survey work, impact assessment, on-farm trials, establishing linkages with intermediary extension organizations, multiplication of seed and planting materials, publications/newsletters, extension materials and training extension personnel in RAV technologies. Crop improvement would be responsible for research but can also be called upon to particpate as team members with the FSR/O section in on-farm work.

VI. RECOMMENDATIONS ON FSR

1. RAV should combine FSR and outreach sections into one section, redesignated as FSR-Outreach (FRS/O). It should be staffed by an agronomist, an economist and an outreach specialist. A rural sociologist should be added as soon as a qualified candidate becomes available.

2. RAV should clearly define the basic functions of the FSR-Outreach section and its relationship with the crop improvement section:

   a. identifying production constraints and improvement opportunities through surveys

   b. evaluation of technologies both on-station and on-farm

   c. outreach activities including monitoring and feedback

   d. impact assessment.

3. Regular interactions between crop improvement sections and FSR-Outreach sections should be ensured by regular meetings and monitored by the program directors.

4. On-farm tests conducted by RAV should be concentrated in selected representative villages of the major farming systems for better management and supervision.

5. A short-term consultant in agricultural economics should be provided for six weeks to work with the FSR-Outreach sections of the National Programs to plan and develop technology impact studies. Linkage with projects conducting socio-economic studies will greatly benefit RAV in the impact assessment activities.

6. Follow-on project design should review the working of the FSR/O section and suggest improvements needed.

ANNEX 6

OUTREACH

SUMMARY

Outreach in the Zaire Applied Agricultural Research project has been disappointing with a few notable exceptions. Almost no institution building has taken place. Ties with collaborating organizations are weak technical publications for extension are inadequate and qualified personnel are lacking. The amount of improved maize seed and cassava cuttings distributed is, however, impressive. This implies that research has done a good job of developing better varieties. A good product will sell itself. It will sell much faster in a country with poor infrastructure, and communications, if an effective outreach program is actively pushing it.

The arrival of the latest outreach specialist in M'Vuazi will ensure that PRONAM's efforts in Bas-Zaire will continue to be on the right track. Further work in strengthening formal ties to collaborators, training and information need to be accomplished. PRONAM's work in the Bandundu region is also impressive although even more informal than in Bas-Zaire. PRONAM did an excellent job of distributing improved varieties in Zaire's most important cassava producing area. PNL's work with Peace Corps Volunteers in the Gandajika area should also be mentioned, where over 200 demonstration plots with contact farmers were established.

PNM had no outreach section until late 1987 when it was staffed by an agronomist (Ao level) drwawn from FSR section of PRONAM. However, there has been a significant demand for maize varieties by the development projects (PNS, PCS) and NGO organizations. Recent arrangements whereby PNM will be collaborating with PCS on promotion of maize are encouraging.

Until the PACD, outreach should work on developing better linkages with collaborating organizations and strengthening the staff of collaborating organizations, through training and provision of information materials. Outreach and FSR should be merged and outreach take on the responsibility for feedback on varieties tested on-farm and promoted throught outreach efforts. Despite the problems that outreach has experienced it can be turned around quickly if the right emphasis is given to this activity.

Evaluation Team recommends that:

1. All vacant positions in the outreach sections be filled immediately with qualified personnel.

2. At least one more A1 level candidate should be sent for M.S. level training and extension.

3. Outreach activitivies in all the three national programs should be strengthened systematically: formal linkages, clear definition of roles of the national programs vis-a-vis the collaborating organizations, and feedback mechanism etc.

4. Immediate steps should be taken to produce information material on new varieties/technologies available through the national programs.

5. A short term technical assistance in ourtreach be provided to PNM and PNL programs to provide advice on systematic organization of outreach activities. Institutions such as Winrock International, University of Illinois (Interpaks) and KSU (Kansas State University posses capabilities in this area.

6. A follow-on project should concentrate on strengthening an outreach program with training and technical publications/advice and feedback as the two most important elements. Improved varieties should be provided for large scale testing and initial promotion efforts.

I. INTRODUCTION

The 1986 evaluation of the RAV project stated that it was impressed by the enthusiasm and dedication of the outreach staff. Both of the original outreach personnel have resigned, their enthusiasm abated. This report will try outline the reasons for their leaving the project.

Extension efforts are not usually appreciated by research and often takes a back seat to scientists, especially when the scientists control the finances. This project has been no different. Training programs have been cancelled at the last minute due to lack of funds, the head of outreach in PNM can not travel further than his motorcycle will carry him round trip in a day, again for lack of funds; outreach publications cannot be reproduced- lack of funds. The head of PNL's outreach section has just been appointed within the last month and only 60 percent of his time is to be spent on outreach. The priorities in the management of this project's outreach section have definitely been tilted towards research science which has not left much time or resources for social science.

Dr. David Miller, director of the training and outreach sectors of the RAV project at the Kinshasa administrative level made several recommendations for improvements in the outreach component of the project in his end of tour report in May, 1987 just before his departure. None of these recommendations have been put in place although they could have made a tremendous difference in RAV's outreach activities. Among them were:

- The director of outreach should have direct supervision of all outreach staff, with power of delegation to regional coordinators for supervision of regional staff.

- The director of the outreach and staff development and training component should be a director position, equal to the director positions of each of the research programs.

- A financial base for the total outreach program should be identified. These finances could be administered on both a regional and national level.

These are only three of twenty-four recommendations made by Dr. Miller. The response of RAV is to do away with the position, relegating it to a field level position, away from the coordination unit. It would seem more logical to want to strengthen the project's weakest section rather than trying to make it go away.

Outreach efforts of all three programs have been hampered by a lack of vehicles, a lack of funds for trips and a lack of qualified personnel. Perhaps the greatest constraint to the three programs was a lack of clear direction from Kinshasa on the importance of the outreach program, how it fit into the research efforts and what it was to accomplish. Secondary were the means to do the job. For over a year RAV could not decide what to do about Dr. Milller's position and who to station in the field. RAV apparently felt that one ex-patriate living in M'Vuasi could handle the entire outreach effort for an entire region from one research station. The level of effort put into the outreach program has been minimal (with the exception of PNL's work with Peace Corps volunteers in Gandajika and PRONAM's efforts at PRONAM since May, 1988). The program suffers from a lack of direction.

The personnel of the National Maize Program and National Legume Program must be congratulated on being able to endure the conditions under which they work. PNM has had most of its offices, laboratories, and other buildings taken from it and given to a new Yugoslavian hybrid maize research program for Shaba. The loss of PNM's facilities began in 1982 when the labor unions were given the farm, followed by DAIPN and now the CRM program. In addition, they are very short of vehicles, work with very little resources and no scientific equipment.

PNL is in a very isolated area with little or no communication to the outside world except through Mbuji-Mayi, 100 kilometers away on a very bad road. Health services are limited and families have little or nothing to do causing a great deal of stress and tension. PNL is also working with little or no equipment. The materials they work with were left from PRONAM or formerly belonged to INERA. Transportation for on-farm research or outreach is not always available. One has to admire the efforts that have taken place in the PNL program under these conditions.

Despite the problems mentioned the program can be turned around quickly with the right effort, direction and committment on the part of the RAV and National Program Directors. Comments on each program follow with conclusions and recommendations.

II. PRONAM

A. Program Strategy

PRONAM's outreach program relies on intermediary organizations to distribute results of their research. Improved varieties of cassava are sold or given to the intermediaries who then act as the new technologies' extension agents. Intermediary organizations effecting extension for the RAV project range from religious to government to private voluntary organizations and private companies. Given the realities of the government's national extension service and its effectiveness, using development organizations, church groups and private companies is a viable alternative and, since the arrival of the IITA outreach specialist, is functioning as previewed in the Project Paper.

The outreach section of PRONAM, as with PNM and PNL, is also responsible for rapid multiplication of planting materials for Farming Systems on-farm trials, for multi-locational trials and for diffusion to collaborating organizations, for sale, and for individuals or groups. The multiplication fields were well attended and were multiplying new varieties for research as well as on-farm trials and outreach work.

PRONAM also works directly with the existing government extension service in Bas-Zaire when they wish to penetrate a new area where their collaborating organizations do not work or have access. PRONAM decides, in counsel with their collaborating development organizations, which areas of Bas-Zaire will benefit from new technologies and the Inspecteur de Zone's advice is solicited concerning that area's extension agent's ability and will to work. In many cases the Inspecteur has told PRONAM that they would be better off working in other areas than to work with extension agents in his zone.

In the 1987-1988 season PRONAM worked directly with 39 villages in 14 "collectivites". PRONAM actually distributed more planting material than their collaborating agencies. PRONAM's outreach service meets with its collaborating intermediaries and decides the strategy to use in distributing cuttings: where PRONAM will work and where the intermediaries will work; and who comprise the target groups. PRONAM gives preference to peasant associations, cooperatives or simple village groups who agree to plant community multiplication fields. Individual farmers receive last priority for cuttings.

Extension agents commonly charge farmers for new technologies which are to be given away for free or try and fine them if they do not plant as told or when told to. PRONAM does try to avoid such extension agents. Working with extension agents is outside the scope of the Project Paper. With only limited resources at PRONAM's disposal it would be advisable to concentrate its efforts on establishing stronger linkages with intermediary organizations and improving their own outreach efforts.

B. Collaborating Organizations

1. Criteria for Selection of Collaborating Organizations

Criteria have been established for working with intermediary development organizations by the outreach section of PRONAM in Bas-Zaire. Organizations asking for materials and training must be able to satisfy the following conditions:

- They are capable of assuring distribution and diffusion of the improved varieties of PRONAM.

- They will spread new innovations in cassava agronomy developed by PRONAM.

- They will develop multiplication fields themselves, in their own fields, for future exploitation.

- They will assure follow-up with groups or farmers who receive materials from them.

- They will prepare an annual report which includes the following information:

a) performance of the varieties distributed
b) quantity distributed during the year
c) the number of villages and farmers adopting the new varieties.

PRONAM will give planting materials to any peasant farmers asking for them but concentrates on model farmers and organized groups, associations or cooperatives.

Criteria have been established only for the Bas-Zaire region. The head of PRONAM's outreach service in the Bandundu region did not establish written criteria. His considerable experience in the area and his knowledge of the history of the collaborating agencies allowed him to deal with agencies on a more informal basis. Unfortunately, now that he is no longer with the project no type

of institutional linkage exists between the project and the organizations with which he dealt.

2. PRONAM's Collaborating Organizations

PRONAM has worked with approximately 54 intermediary organizations in their respective regions. Although the list of collaborators is impressive, the RAV project seems to be tempted to list any organization that has asked for information or who has contacted other intermediary organizations for information on new varieties or the actions of PRONAM. For the purposes of actually extending new technologies the list of principal collaborators is significantly reduced. Even considering the reduced list the number of field trials and material distributed are encouraging. The following list provided by the outreach section of PRONAM highlights their principal collaborators by region:

REGION: BANDUNDU

- L'Association de Planteurs pour le Developpement Rural de NKO Zone de Bulungu
- BUNASEM
- Centre Agricole de Lusekele CEBEZO- Centre de Sante de Bokoro
- CODIAK
- Collectivites de Mudikalunga et Yassa-Lokwa
- Developpement Progres Populaire d'Idiofa
- L'Eglise Kimbanguiste
- L'Eglise Protestante CEBIE
- L'Eglise Protestante CEFMZ a Kajiji et a Kikwit
- Ferme Agri-Bandundu
- L'Inspection Agricole de Gunga
- L'Institut Superieur Pedagogique
- L'Institut Technique Agricole de Lamba
- Madail Lutshima
- Orphelinat Intshwem
- Pisciculture Familiale a Gungu et a Kikwit
- PROCAR

REGION: BAS-ZAIRE

- Programme National Engrais
- Armee de Salut
- PRODERIM
- OXFAM
- EFTABL (Forces Armees Zairoises)
- Centre de Developpement Communautaire de Kimpese
- APRODEC
- Groupe Technique d'Encadrement Rural de L'Eglise du Christ
- Centre D'Encadrement Paysan
- Bureau D'Encadrement et de Developpement Integre
- Cooperative Agricole et L'Elevage de Mbanza-Muembe
- Centre de Developpement Endogene Paysan

- Project Italo-Zairois de Nkundi/LUOZI
- Projet D'Apupui des Associations Villageoises
- CIZA/LUKALA
- ITA/GOMBE-MATADI

REGION: KASAI ORIENTAL
- Centre de Developpement Esperance de Nkumba/Katanda
- Communaute des Anges/ Luputa
- Ferme Semenciere de Kisamba/ Kivu
- Planteur de Tshlinge
- Prison Centrale de Kabinda
- Projet 105 (USAID)
- Projet Nkata Masuika/Kananga
- SOPEKA de Miabi

C. Outreach Effectiveness

As with most research/outreach relationships PRONAM research has clearly been the priority of the program. Until May of 1988, when he left PRONAM, the head of the outreach section was Dr. Pandry. RAV's policy prohibits anyone being named head of a section if he/she does not have at least a Master's Degree. Doing the actual work of the outreach section between the time that Dr. Pandry left and Dr. Florini arrived in M'Vuasi Dr. Bartlett of IITA was in charge of the program.

The relationship between an A1 technician, who did most of the outreach work after Dr. Pandry left, and PhD scientists and his ability to influence the amount of resources to be allocated to outreach is minimal. Despite a less than enthusiastic attitude towards outreach by researchers, the outreach program has made impressive progress towards establishing an outreach component with linkages to the intermediary organizations, farmer groups and the existing extension service. Distribution of materials is being documented and intermediary organizations are finally being asked to provide statistics on distribution by variety, constraints and post-acceptance feedback on performance.

1. Distribution of Varieties by Outreach

PRONAM's figures for distribution of improved varieties before 1987-1988 are not good. Outreach organizations have not been giving feedback to the outreach section. All statistics kept until the arrival of the latest IITA specialist in outreach were taken by her predecessor, Dr. Pandry on his departure, so distribution of planting materials is reported by totals, not by organization, village or collectivity.

TABLE 1

1986

Quantity distributed by PRONAM Directly to Farmers (cuttings in meters)	98,250 (meters)
Number of Farmers Receiving Materials Directly from PRONAM	1,965
Distributed to Collaborating Agencies	135,925(meters)
Number of Farmers Served By Collaborating Organizations	2,718
Quantity Sold	256,325(meters)
Total Sold or Distributed to Public	490,500 (meters)

Statistics for 1986 should be examined carefully. Dr. Pandry used a standard of 50 meters of planting materials per farmer to estimate the number of farmers served with new varieties. In many cases farmers actually receive 100 meters or, if they were planting a demonstration field they received 150 meters.

Feedback from organizations on the numbers of farmers served, demonstration plots and multiplication plots established and distribution by variety are much better for 1987-1988. The improved reporting is due to a more concentrated effort to obtain impact information by USAID and the efforts of PRONAM's outreach section. Statistics are given by region, village and collectivity when available.

Table 2

Cuttings Distributed to Collaborating Organizations

M'Vuasi

Quantities in meters:	Kinuani	F100	02864	Total
Armee de Salut	1250	1250	0	2500
CDEP	0	3200	500	3700
CeDeCo	4000	1500	200	5700
CIZA	6550	0	0	6550
Ecole Primaires et Ins. Agricoles	2000	0	0	2000
EFATBL	350	0	1600	1950
ITA Gombe Matadi	1000	500	500	2000
OXFAM	0	2500	1500	4000
PNE	2350	6250	0	8600
PRODERIM	5800	5050	4500	15350
Projet Italo-Zairois	500	1500	300	2300
Total	23800	21750	9100	54650

Gandajika

(Gandajika is not reported by variety)

Quantities in meters:

- Centre de Developpement Esperance de Nkumba/Katanda	1130
- Communaute des Anges/ Luputa	1770
- Ferme Semenciere de Kisamba/ Kivu	7500
- Planteur de Tshlinge	5900
- Prison Centrale de Kabinda	1875
- Projet 105 (USAID)	12228
- Projet Nkata Masuika/Kananga	0
- SOPEKA de Miabi	1061
Planteurs de Gandajika	20754
Total	52218

Distribution directly from PRONAM

In meters:

Kinuani	F100	02864	Total
27900	13500	12650	54050

Bandundu

Government Organizations

- BUNASEM	10000
- Centre de Sante de Bokoro	200
- Collectivites de Mudikalunga et Yassa-Lokwa	5000
- Collectivite de Yassa Lokwa	17000
- Inspection Agricole de Gunga	12000
- Orphelinat Intshwem	2000
- Projet de Pisciculture Familiale	2250
- PROCAR	1100
- Zone de Luklela/Kikwit	0
- CODIAK	1500

Religious Organizations

- L'Eglise Kimbanguiste de Kalele	1000
- L'Eglise Protestante CEBIE	2500
- L'Eglise Protestante CEFMZ a Kajiji et a Kikwit	1050
- L'Eglise Protestante CEFMZ de Kahemba	1300
- Centre Agricole de Lusekele	15000

Educational Services

- L'Institut Superieur Pedagogique	1250
- L'Institut Technique Agricole de Lamba	600

Private Companies

- Ferme Agri-Bandundu/Muyulu	5000
- Madail	8500
Farmers	2400
Total	89,650

The 89,650 meters of planting materials distributed in 1987-1988 represent only 28 % of the requests received by PRONAM for improved planting materials from the Bandundu region. A total of 317,887 meters of material were requested but could not be delivered. (see section II.C.3 Constraints)

The resignation of PRONAM's outreach specialist in Bandundu region has seriously affected the distribution of improved cassava planting materials. The Kiyak aoutreach specialist resigned after trying to obtain cuttings and funds for implementing his outreach efforts with liitlwe effort. Progress in extending the new technologies in the Bandundu region is apparent from a study being done by the Catholic University of Leuven (table 3 below) which found that in Bandundu region 22.07 % of all persons interviewed said that F100 cuttings were available. This is in comparison to

only 10.06 % positive response for fertilizer, a project that has been on-going for 12 years and sponsored by the FAO. F100 has been available since only 1979 years. The same study has found that Bandundu is already a more important source of cassava products for the Kinshasa market that Bas-Zaire. In the evaluator's opinion it is not possible to cover both the M'Vuasi regions and the Bandundu regions and obtain the same results using one person. RAV should have made every effort possible to replace the iyaka outreach specialist. Whether it be with an ex-patriate while awaiting the return of a national from training or someone transferred from another program it should be done. Bandundu is one of the most important cassava regions and should benefit from PRONAM's improved technologies.

Table 3: Availability of Certain Inputs in the Sub-Regions of Bandundu.

	Bandundu %	Kikwit %	Kwango %	Kwilu %	Weighted Ave. %
Tools					
Available	14.46	82.39	37.92	38.51	38.87
Not Available	85.54	17.61	62.08	61.49	61.13
Fertilizer					
Available	0	68.84	9.43	8.97	10.06
Not Available	100	31.16	90.57	91.03	89.94
F 100 Cuttings					
Available	3.96	71.12	27.38	18.50	22.07
Not Available	96.04	28.88	72.62	81.50	77.93
Improved Seed					
Available	0	12.11	8.70	9.07	8.93
Not Available	100	87.89	91.30	90.93	91.07

Table reproduced from "La Vente des Produits Agricoles Par L'Agriculteur Traditionel Dans les Sous-Regions Du Kwilu et Du Kwango Et Les Villes de Kikwit et Bandundu; Dept. of Agriculture, Projet A.G.K.U. Leuven IN12, September, 1988.

2. Institution Building

Outreach programs depend to a great extent on building a viable (sustainable) system capable of delivering technologies which are acceptable, improve the well being of the target group (value) and provide feedback to the technology generators so that acceptance can be estimated, changes in technology made to accommodate shortfalls and changes in the system or improved technologies can be returned to the outreach system. PRONAM is just setting such a system in place in M'Vuasi. The arrival of an IITA outreach specialist has turned the outreach program of PRONAM into a vital part of the program. PRONAM has begun to establish contact with a number of intermediary organizations and farmer groups, has begun to collect relevant data concerning diffusion of technologies and acceptance by farmers and is trying to maintain linkages with the researchers through the Farming Systems component.

In order to build upon the research and outreach effort of the PRONAM project there are two basic elements which must be developed: (1)linkages between the intermediary organizations, including private companies, religious groups, farmers' associations or cooperatives, private voluntary groups and government organizations; and (2) linkages with the research and Farming Systems component of the project. To date neither of these

linkages has been adequately accomplished at PRONAM although progress has been made and the future is promising.

Linkages with intermediary organizations are established through personal contact, mutual need, training (including formal training on station and informal training through brochures, technical manuals or pamphlets and visits to demonstration and multiplication fields of the intermediary organizations by members of the PRONAM outreach staff) and feedback. Links with research depend on the researchers' need for guidance in their research from farmer feedback and the extension agents need for improved technologies useful to the target group.

a. Training

PRONAM has trained 271 extension agents since 1982: 110 in Bas-Zaire, 137 in Bandundu and 24 in Gandajika. The present project has conducted 6 training sessions in M'Vuasi (2 in 1986, 3 in 1987 and 1 in 1988. Each training session includes at most 14 agents making a total of 56 extension agents trained in new technologies by PRONAM. In March, 1986 a training session was held in Kiyaka for 14 collectivity agronomist and for 9 Oxfam agents at M'vuasi. Workshops have also been held in M'Vuasi and Kiyaka for the staff of collaborating agencies to inform them of progress in developing technologies. These workshops were organized by Dr. Pandry and Mr.Cam Burns. PRONAM also held one farmer's day where extension agents and collaborating intermediaries were invited to visit M'Vuasi and see the research taking place. 40 peasant farmers were also invited to attend.

Informal training; pamphlets, technical bulletins, regular informational contacts with collaborators or training materials provided to collaborating organizations are non-existent. The last technical bulletin put out by PRONAM was in 1985 and it was the only one ever published. When Dr. David Miller was in charge of outreach and training in Kinshasa a number of extremely interesting publications were developed for outreach which never saw fruition due to a lack of funds.

PRONAM should immediately begin to strengthen it linkages with its intermediary organizations by producing a regular publication highlighting new technologies being developed, new cultural practices which may increase yields, sections on maize and legumes which will encourage interest in the other National Programs and a section on feedback received from intermediary groups and farmers. These publications should be shared with all PRONAM's collaborators, the Dept. of Agriculture and the other research institutions and National Programs. The lack of a publication or technical bulletin of this kind in a fifteen million dollar project with a heavy emphasis on outreach is a severe constraint on meeting project objectives.

b. Feedback Linkages

Establishing the feedback mechanism between extension organizations and PRONAM and strengthening this linkage should be a high priority for PRONAM. Internal evaluation and monitoring can not be done without an operational feedback mechanism. Initially, information will be collected on distribution of various varieties, demonstrations, multiplication plots and quantities distributed to farmers which is a good indicator of outreach's ability to "move" new technologies off the shelf and into the field. An equally important link in the feedback network is to provide a wide range of information on post distribution acceptance over a number of seasons and a wider range of cultural practices and microclimates to researchers who develop new varieties. This Farming Systems linkage not only improves the technologies coming from the research organization but it establishes a need for extension on the researchers' level. Information feedback will establish the missing link between research, extension and the farmer.

This feedback mechanism is only just beginning at PRONAM. Intermediary extension groups need to be better informed about the value of their feedback and how it will help them achieve their own goals. They must be willing to fulfill the criteria for collaborating with PRONAM and PRONAM must be willing to enforce its own criteria. Simple forms showing numbers of farmers receiving materials, their location and feedback over a series of planting seasons should be established by the outreach section and put into effect as soon as possible.

c. Staff

IITA outreach specialists will not be with the RAV project indefinitely. It is of critical importantance to place a well trained national who has the respect of his fellow colleagues in research as head of the outreach section of PRONAM. Without a respected individual in this position outreach will continue to receive the least support, the worst vehicles and the smallest budget.

As stated earlier, RAV's outreach specialist in Bandundu, on contract to USAID as a local hire left the project earlier this year. Considering the importance of cassava in the south of Bandundu this is a regrettable occurrence. It is strongly recommended that the outreach specialist position for Bandundu be filled as soon as possible.

3. Constraints

Outreach staff in M'Vuasi identified a number of areas where improvements would be welcome. The general feeling among outreach staff in M'Vuasi is that they are making the best of a bad situation, doing the most with the little they have available. With

outreach on the right path in M'Vuasi there are no major constraints to achieving the project's objectives that can not be rectified with improvement in certain situations. Some of the major areas where improvements are needed are:

a. Vehicles

Outreach, more than any other discipline except perhaps Farming Systems, relies on the ability to contact intermediary organizations, farmer groups, cooperatives etc.. and to be able to deliver promised products when they say they will. Nothing discourages a group more than to wait for days for promised inputs and not have them show up. Most farmers deal with a ten to twenty day period when their crops have to be in the ground. Local varieties of corn will yield 30% more if planted at the optimal time, improved varieties will increase by more than a ton/ha. If outreach agents promise to deliver planting materials on a certain day then they must do so or lose the confidence of their target group. Once lost this confidence is very difficult to reestablish.

The poor condition of PRONAM'S vehicles and the lack of spares and replacements is a major constraint. This has seriously affected the performance of the outreach team and led to frustration and termination of contracts. Procurement of vehicles, passenger and for the transport of commodities, needs to be accomplished immediately.

b. Lack of Funds to Develop Technical Bulletins

David Miller produced striking examples of the kind of technical bulletins needed by the outreach section of PRONAM to help develop their linkages to the intermediary extension groups. Final translation and publication was cancelled due to a lack of funds. Publications should be considered as critical to the functioning of the program as a whole and given the necessary consideration to see that funds are available to publish at least a bi-monthly newsletter/technical bulletin. It is strongly recommended that publication of technical information be started as soon as possible.

c. Trained Staff

Trained staff in extension/outreach in Zaire has been discussed in a previous section. In all of Zaire's research institutions there is only one person trained in agricultural extension beyond a B.S. level (World Bank working paper) out of a total of 199 trained agricultural scientists. A PhD or MSc level anthropologist, social scientist or agricultural extension specialist should be recruited as IITA's outreach expert's counterpart in M'Vuasi without delay.

Outreach staff in M'Vuasi also cited the lack of outreach personnel at the antenna stations in Kisanga, Gandajika and Kiyaka as constraints to their productivity. Kiyaka is the only station where PRONAM has comlete responsibility for outreach activities. The other stations are handled by PNM and PNL respectively.

d. Intermediary Organizations

PRONAM has begun working directly with farmers' groups, associations, cooperatives and individual farmers where there are no intermediary groups. The lack of intermediary groups forces PRONAM to work with the existing extension service if it is to deliver materials to certain areas of Bas-Zaire. Although this is an admirable undertaking, PRONAM should resist the temptation to do everything at once. Funds could better be used strengthening existing ties with the intermediaries, developing better feedback systems and encouraging relations between research, Farming Systems and outreach.

e. Planting Materials

PRONAM does not have enough improved planting materials to satisfy demand, even though the outreach service has only just begun to actively contact intermediary collaborators. This was especially true in Bandundu region where less that 30% of the requests for F100 were filled last season.

III. PNM

A. Program Strategy

PNM's outreach program strategy to date has been to rely on the success of varieties developed during the previous CIMMYT project (before RAV took over) and hope that organizations would continue to come for Kasai 1 and Salongo 2 until new and improved varieties could be developed. PNM's outreach program has had the great advantage of working with two USAID projects (North Shaba and Central Shaba) who use its improved varieties in their own outreach programs. These two projects have been responsible for any success that the outreach program of the PNM portion of the RAV project has had to date.

The Central Shaba project (105) has set in place an impressive outreach service, based on contact farmers. 105 was to use the same system of intermediary organizations to do their extension work but either enough functioning NGO's do not exist or they are extremely weak, 105 has taken the initiative to work with contact farmers who actually do most of the project's extension work. The RAV project, especially PNM, should use Central Shaba as an example for their outreach service.

PNM had no outreach section until late in 1987 when the FSR team leader decided that he could no longer work with an agronomist A1 level hired by RAV and assigned to the FSR section of PNM. The agronomist was not able to perform his job at a satisfactory level and was transferred to the newly created outreach section for which he was unsuited.

PNM's operational strategy is (in concept) the same as those for the other two National Programs, to work through intermediary organizations to extend new technologies developed through the Farming Systems approach.

B. Collaborating Organizations

1. Criteria for Selection of Collaborating Organizations

The only criteria for selecting organizations as intermediaries are that they ask and have the money to pay for seed. Two organizations, BUNASEM, the national seed company and Hinterland Minier have signed memoranda of understanding with RAV delineating their relationship. With the larger companies and intermediary organizations there are memoranda of understanding on file in Kinshasa but this type of formal linkage is new. The first agreement was signed in October, 1988.

2. PNM's Collaborating Organizations

PNM has in the past or is currently working with the following organizations. Some are informational ties only, others buy seed from the project. The list is much shorter than that for PRONAM for two main reasons: 1) there is very little outreach activity at all in PNM; and 2) PNM's standing suffered seriously in January, 1987 after organizing a training course for extension agents which was cancelled at the last minute after many of the extension agents had already arrived in Lubumbashi and then had to return to their posts with no training.

- L'Inspection de l'Agridral
- Le CEPC
- Le Shalamo
- Le CEATA (Centre D'Encadrement des techniques Appliques)
- La GECAMINES Developpement
- Le H.C.R. (United Nations High Commission for Refugees)
- Trabeza
- Sagricim
- Le P.N.E.
- Central Shaba Project
- North Shaba Project
- Lubudi Project
- Hinterland Minier du Shaba
- BUNASEM

C. Outreach Effectiveness

PNM's Director does not seem to regard outreach as a serious part of PNM's efforts. He has assigned someone he does not trust to be head of the outreach section and whom he does not allow to travel or visit intermediary organizations. With such an attitude on the part of the Director it is clear how the effectiveness of the outreach program of PNM can be rated. Outreach needs to get to the extension intermediaries well before the planting season with both technical information and new varieties.

PNM's contact with these organizations has been reduced to writing letters and asking how many of them actually contacted peasant farmers. Of all the organizations described above by PNM as being collaborating intermediaries only three responded, and one of those said that they had indeed distributed 147 tons of seed - SR 52, a very popular variety from Zimbabwe, not from PNM.

These letters were from the 1986-1987 planting campaign. No responses have been received from requests for information for 1987-1988 except for North Shaba project and P.N.E. who report distributing 120 tons and 111 tons of Kasai 1 and Shaba 1 respectively during the 87-88 planting season. This represents approximately 75,000 farmers according to PNM which divide the weight of seeds distributed by the area an average farmer can plant and by the kg/seed per hectare needed for planting in order to determine the number of farmers served.

1. Distribution of Varieties by Outreach

Despite problems with travel and staff PNM was able to distribute three different varieties of foundation seed to a small number of organizations. The following tables are taken from PNM's Activity Reports of 1986-1987 and 1987-1988:

Table 4: Foundation Seed 1986-87

Shaba 1		Kasai 1		Salongo 2	
Beneficiary	Qty..	Bene.	Qty	Bene.	Qty.
TRABEZA	1,250 kg.	PRODALU	240 Kg	Ferme Semenciere	
SAGRICIM	1,000 kg.	PNS Kongolo	50 kg	de Kisamba	90
Projet LUBUDI	1,000 kg.	BUNASEM	240 kg	PRODALU	160
Total 1986-87	3,250 kg		530 kg		250

1987-1988
Foundation Seed:

Shaba 1		Kasai 1		Salongo 2	
Beneficiary	Qty..	Bene.	Qty	Bene.	Qty.
TRABEZA	5260 kg.	Trabeza	1000 kg	BUNASEM	90 kg.
				ProjetLubudi	
1295 kg.			PNL Gka. 29 kg		
			PNM Gka. 170 kg		
TOTAL 1987-88	6555 kg		1000 kg		289 kg

Commercial Seed:

Shaba 1

Beneficiary:	1986-87 Amount: (Kg)	1987-88
Projet 105		
Central Shaba	1,025	
Protestant Mission	100	
Chiate Mission	100	
Zone de Kipushi	75	
CEPC Shaba	43	
PNM Intermediary Agents	877	
Individuals	53	
Mission Pentacoste-Kamina	0	200
Trabeza	0	2640
Total	2,273 kg	2840 kg

Kasai 1		
P.M.K.O. (Kasai Oriental)	4,000	2200
PRODALU	1,000	
Shaba Central (105)	1,000	
J.V.L.	780	
PNE	0	100
PNL	0	10
Trabeza	0	3500
Total	6,780 kg	5810 kg
Salongo 2		
PNL Agents	186	
Shaba Central (105)	100	
PRODALU (K. Occ.)	1,800	130
PNL	0	62
Domaine Muyaya	0	800
Agents PNM	0	43
Individuals	0	380
Total	2,086 kg	1415 kg

Total commercial Seed Distributed 1986-87 11,139 kg
Total commercial Seed Distributed 1987-88 10,065 kg

2. Institution Building

No attempt will be made to repeat what has already been said about institution building in extension work (Section II. C.2) and how important the process is in developing a sustainable mechanism for delivering improved technologies to farmers and bringing feedback to the researchers.

Linkages between researchers and field level extension agents through intermediaries are very poor. The strongest links that PNM have are with other USAID projects or former projects. If project 105 and North Shaba did not need improved seed it is doubtful that they would have any contact with project 091.

One of few encouraging signs concerning outreach in the PNM program is that PNM is the only National Program that sent a participant to the U.S. for training in extension.

a. Training

No formal training has taken place at PNM for extension agents. As mentioned above, the only training program to be planned was canceled at the last minute because of a lack of funds. The PNM technical team was able to give some of the unfortunate extension

agents who had come to Lubumbashi a one day training overview and to show them the research work going on in the field.

Informal training in the form of pamphlets, technical bulletins and newsletters do not exist. One small handout was developed in 1985 for production of improved varieties of corn but they are kept in the Director's office, unavailable to the head of the outreach service. It deals entirely with how to use chemical fertilizers.

b. Feedback Linkages

Feedback linkages consist of writing letters and hoping that they are answered. Immediate action needs to be taken to correct this situation. All collaborating organizations should be trained in feedback techniques, the type of feedback researchers need, forms should be developed and PNM agents should help conduct feedback surveys in the field with extension personnel. If collaborating agencies believe that PNM is not interested in feedback they will not try and cooperate with the small effort made by writing to them for information.

c. Staff

The second in command of outreach at PNM is permitted to do very little. He is not qualified for the job and should have been assigned to elsewhere. There are two other outreach staff who are A2 level agronomists who deal with multiplication of seed for distribution.

The budget for the outreach section went from 1,085,000 in 1987 to less than 300,000 Zaires in 1988 even though new varieties are expected to be ready for distribution during the 1989 planting year.

3 Constraints

Constraints for the PNM section are much worse than for PRONAM. PRONAM has turned its program around and are on the right track. The same thing is possible for PNM. All of the constraints faced by PNM/Outreach can be overcome. The major constraints at the moment are the following.

a. Qualifications

The second in command of the outreach section does not have the confidence of the project Director or any of the other staff members, including the researchers and IITA technical team. As said before he was placed as head of outreach to get him out of the way. PNM must put a respected individual in this position, someone with qualifications equal to those of the other researchers. In December, 1986 a Zairian participant with a PhD in rural sociology

will return to PNM from the United States. This person should be made chief of the outreach section. He should be given a budget to work with and have control over. He should work with PRONAM for at least one month and see how she has organized the outreach section at PRONAM.

b. Vehicles

This constraint will be echoed throughout the evaluation report. The state of the vehicles at PNM is deplorable. An adequate budget for maintenance and repair should be given to RAV for vehicle upkeep. The roads in Shaba are long and rough even on Landrovers. New vehicles should be purchased as soon as possible and the old ones repaired.

c. Training

Training programs for outreach extension agents should be organized as soon as the new head of section completes his training with PRONAM. Publications on the new varieties of corn and cultural methods should be prepared and distributed to collaborating organizations. Formal memoranda of understanding should be signed with collaborators and ties should be strengthened between project 105, North Shaba and RAV.

d. Administration

The PNM administration should be informed by RAV Kinshasa about the importance of the outreach section of the project and how important it is to the funding agency and the success of PNM.

IV. PNL

A. Program Strategy

PNL, like the other programs is trying to work through intermediary organizations and to establish linkages with these organizations to accomplish their outreach goals. The program strategy to date has been to wait until the intermediary organizations contact PNL and ask for help or materials. No effort has been made to actively pursue the intermediary organizations except two training programs for extension agents of the Peace Corps, the Central Shaba project and several Department of Agriculture extension agents. Any diffusion of new technologies has been through osmosis and not through a planned, active effort to diffuse improved varieties to farmers or intermediary organizations. The head of the FSR section at PNL, has made contact with over 200 small farmers by working with contact farmers through 2 Peace Corps volunteers. 8 more volunteers are scheduled to be assigned to the area which will help in outreach efforts.

Only recently has anyone been put in nominal charge of outreach activities at PNL and the agronomist who now heads the section is seconded from PRONAM and has been informed that he is to spend only 60 percent of his time working on outreach and the other 40 percent on PRONAM's priorities at Gandajika. Staff at Gandajika are cut off from the world by distance and by a lack of information. Some of the research staff did not even know what the per diem rules were for the project and had no idea what the outputs of the project were supposed to be. In PNL, outreach personnel feel completely cut off from any information or ability to effect any change in the present way of administering the project.

B. Collaborating Organizations

1. Criteria for Selection of Collaborating Organizations

No criteria exist for selecting intermediary extension agents except that they have contacted the project and asked for information or seed. There are no clear criteria for working with the project.

2. PNL's Collaborating Organizations

PNL lists 18 different government, private and non-governmental organizations in three different regions; Shaba, Kasai Occidental and Kasai Oriental as collaborating organizations. As is the case with PRONAM, PNL also works directly with state extension agents in areas where there are no NGO or other organizations. PNL also gives or sells seed directly to farmers who come to the station asking for improved seed. The collaborating organizations are as follows, by region of operation:

In Kasai Oriental;

- Projet Mais de Kasai Oriental
- Projet Rural Diocesain
- Centre Chretien de Sante
- Peace Corps
- BUNASEM
- Domaine de Muyaya
- UCOOPAGRI
- Projet Mulumba Lukoji

In Kasai Occidental;

- Projet de Developpement de Lulua
- CEDERIM UEKA
- Centre NKATA/LUIZA
- OXFAM

In Shaba;

- Projet Shaba Central
- Hinterland Minier
- Projet Lubudi/SAGRICHIM
- Projet Nord Shaba
- Adventistes du 7eme Jour
- BUNASEM

C. Outreach Effectiveness

PNL's report on seed multiplication highlights the direction that outreach activities have been following since 1985. Although the Project Paper calls for RAV and the National Organizations to work through development organizations for distribution of materials and technology they have concentrated on giving seed to the larger national organizations such as BUNASEM and PRODALU. The most striking finding in the report is the amount of seed given directly to farmers who show up at the station and ask for it. These farmers, who live in the general area, have seen the on-farm trials of the Farming Systems section, have talked to people who work on the station or have seen trials at the station and recognized that the varieties growing are superior to local ones. It has been extension by accidental diffusion.

1. Distribution of Varieties by Outreach

PNL has distributed seeds to the organizations listed in the following tables. Note that "petits agriculteurs" have received more total seeds than any other group. This shows two events: 1) most diffusion/extension is through farmers coming to the station and asking for seeds and 2) that no outreach effort has been made to diffuse seeds to intermediary organizations. It is the feeling of the author of this section of the evaluation report that the other companies and projects listed as receiving seed came to PNL or were directed to PNL by the Department of Agriculture and not vice-versa. CDI- Bwamanda who received the most soybean seed raises soybeans for animal feed.

Table 5:

Organization	Groundnuts	Niebe	Soybean	Total	%
BUNASEM	225	90	515	830	8.2
PRODALU	810	287	300	1397	13.8
Central Shaba	5	-	60	65	.6
Projet Ituri	60	-	20	80	.8
CDI-Bwamanda	-	-	2167	2167	21.4
ONG	248	106	365	719	7.1
Petits Agriculteurs	1144	904	1397	3445	34.1
Research	822	162	420	1404	13.9
TOTALS	3314	1549	5244	10107	100

Among the NGOs who received only 7.1 percent of the seeds distributed over the three years of the project are the following organizations:

Salvation Army, Peace Corps, Cedero/Omedjadi, Fras/Sankuru and CBZO/Lusekele. The reader will notice a difference between this list and the list of collaborating organizations listed earlier. The previous list includes organizations that received information only or cassava cuttings from the PRONAM representative or maize seed form the PNM representative. In a few cases the same organizations are on both lists but the disparity is obvious.

2. Institution Building

Institution building within PNL should have started as soon as the project was put in place in September of 1985. So far very little institution building has been attempted besides establishing the fact that some seeds are available and conducting two training programs for extension personnel. Even if no new leguminous varieties were ready for diffusion through the extension system PNL could have built on the previous presence of PRONAM and PNM and used the improved varieties of cassava and maize which existed before RAV was created to establish an outreach service capable of putting new varieties in the functioning PNL system.

No institutional linkages have been formed and no one has been sent for training in anthropology, social sciences or outreach work from PNL.

a. Training

##/##

Two training programs have been conducted at PNL since the organization began operations in 1985. The two training programs included extension agents from Projet Shaba Central, the Peace Corps and several Dept. of Agriculture extension agents with whom

the project works directly. A total of 35 agents have been trained by PNL.

Three training programs were and are planned for the 1988 - 1989 planting season. The first, scheduled for November, 1988 and to include 20 extension agents from P.M.K.O., Centre Chretien de Sante, Communaute des Anges, Prodalu, Shaba Central, Adventistes and Dept. of Agriculture, was cancelled for a lack of funds. Two others are planned for 1989; one in February, 1989 for 10 Peace Corps volunteers and another in April, 1989 for ONG and government extension agents.

b. Feedback Linkages

As with PNM and PRONAM, PNL should require intermediary organizations to sign memoranda of understanding with the project where responsibilities of both parties are clarified in writing. In the memorandum, the extension intermediary's role in feedback should be defined and formulas for its implementation elaborated. PNL, for its part, should guarantee a certain amount of foundation seed, technical publications and training to each participating organization. Researchers should be instrumental in the writing of the feedback mechanisms in order to assure that the information they need is collected and returned to the station through the outreach service.

Of course, before any formal memoranda are signed the outreach service is going to have to make contact with the collaborating organizations, have meetings to determine where and how they work, their needs for training and how they can help research with feedback from contact and peasant farmers.

c. Staff

As indicated earlier, the outreach staff at PNL consists of only a head of section borrowed from PRONAM for 60 percent of his time. He is an A1 level agronomist and has been the PRONAM representative at Gandajika. An MSc level person should be recruited from among the students in the United States to take over the outreach section of PNL at Gandajika. The Director of Pnl has repeatedly asked that someone be assigned to this critical position. An A1 level agronomist will not command the same respect as an MSc when dealing with the administration, in obtaining vehicles when needed and in working with researchers. The position does not need to be filled by an outreach specialist as long as he has time to work with PRONAM to see how their program is functioning or if Dr. Miller's position is filled by an outreach expert and he can work with the outreach section of PNL to help develop the outreach section.

Staffing of outreach positions within all of the National Programs has been slow. A clear defined outreach policy from

Kinshasa could have helped alleviate the lack of performance of the three programs and especially PNM and PNL in the area of outreach.

3. Constraints

As with PNM and to a lesser extent PRONAM, PNL has had problems with many of the same issues as its sister organizations. Even though the problems are serious they can be corrected with appropriate administrative and financial actions. The major areas of concern by PNL staff are:

a. Vehicles

The lack of transportation is a major block to accomplishing any work in the outreach program. Outreach work takes last priority when a lack of vehicles necessitates sharing vehicles. At PNL the evaluation team saw only three Landrovers that functioned and one could not be turned off without having to push start it. PNL could actually do much of its on-farm and outreach work better with motorcycles. Roads are so bad in the area that motorcycles can go through areas where four wheel vehicles cannot. Motorcycles should not be considered as a replacement of four wheel vehicles but an addition to the motor pool. Gandajika is an isolated station with a non-existent transportation system. Many of the staff live ten kilometers from the research station and have to wait up to two hours to get transportation to work and two hours to return to their homes in town.

b. Funds

PNL heads of section submit budgets to the Director who forwards them to RAV in Kinshasa where they are modified, approved and sent back to PNL. Once in PNL they are controlled exclusively by the Director and not the heads of section. At no time do the various chiefs of section know how much they have left in their budgets or how much they have to spend on their activities. Training programs cannot be planned without lead time and the availability of funds must be guaranteed. A head of section having control of his/her own budget can set priorities for his/her section and know that funds will be available for priority objectives.

V. CONCLUSIONS

Although a good deal of outreach efforts were noticeable, RAV's outreach program was implemented in a haphazzard way. Very little direction on program goals or objectives has come from Kinshasa. Recruiting of staff has been slow. These events have been unfortunate as the outreach program helps determine how the research program is to be evaluated, why farmers are adopting or not adopting new technologies. In this project no feedback

mechanisms exist and the outreach programs linkages with intermediary organizations in PNM and PNL are weak. Very little institutional building has taken place.

Only one person has been sent to study extension and one other to study rural sociology. Given the priority outreach was to have taken in this project it would seem to be an area in which more participants would have chosen for training.

Constraints such as the lack of vehicles and materials has been a serious problem, restricting contact with intermediary organizations and delaying delivery of seed and planting materials. Procurement problems need to be resolved by USAID. The first activities cancelled usually tended to be those of outreach when the funds were limited.

Recent progress of the PRONAM outreach section and PNL's work with the Peace Corps is encouraging. The other National Programs could build on the experiences of PRONAM outreach in working with intermediary extension organizations.

Technology transfer approach employed in RAV outreach programs, namely working through intermediary organizations is probably the only viable alternative to the existing Dept. of Agriculture extension service in a country as big as Zaire. The methodology should be retained in any future projects.

VI. RECOMMENDATIONS

1. All vacant positions in the outreach sections be filled immediately with qualified personnel.

2. At least one more A0 level candidate should be sent for M.S. level training and extension.

3. Outreach activitivies in all the three national programs should be strengthened systematically: formal linkages, clear definition of roles of the national programs vis-a-vis the collaborating organizations, and feedback mechanism etc.

4. Immediate steps should be taken to produce information material on new varieties/technologies available through the national programs.

5. A short term technical assistance in outreach be provided to PNM and PNL programs to provide advice on systematic organization of outreach activities.

6. A follow-on project should concentrate on strengthening an outreach program with training and technical publications/advice and feedback as the two most important

elements. Improved varieties should be provided for on-farm testing and initial promotion efforts.

7. Selected NGOs, government organizations and private companies who will carry out the extension activities of the project should be consulted when preparing the future project paper. Conferences with outreach and extension personnel with each of the three National Programs and NGO,s, Government organizations and private companies should be held yearly to discuss outreach, new technologies, feedback and plan the next year's extension campaign. Funds should be budgeted specifically for these types of conferences.

8. Future project activities should include a very strong training component for outreach at the National Program level. training in agronomy, extension, feedback and Farming Systems should be emphasized.

ANNEX 7

INSTITUTION BUILDING

I. Agricultural Policy

A. State of current national agricultural policy

Since independence in 1960, agricultural production has basically stagnated or declined. For the export crops, only coffee exports have increased since 1960, primarily from smallholders. Food output has not been able to keep pace with population growth, resulting in fairly large food imports of wheat and wheat flour, rice, maize, sugar, fish and meat, etc. The World Bank estimates that in 1985, food imports made up 20% of total imports. By comparison, Zaire was selfsufficient in food in 1960 and agricultural exports had a share of 41% of total exports. The infrastructure/institutional deterioration and the rapid urbanization and rural to urban migration contributed largely to this situation. In 1960, Kinshasa was barely 400,000 people; now it is somewhere between 3 to 4 million.

Part of the problem is that nobody in Zaire knows if food production is actually increasing or decreasing. Agricultural statistics are particularly poor and unreliable, despite efforts by several donors. However, some progress is being made in this area. Food import statistics are also notoriously unreliable; there are the official import figures but there are also unofficial imports which for some commodities appear to be very large e.g. maize. Unofficial estimates of contraband maize imports range from 50,000 tons to 500,000 tons. On the other hand, there seem to be also fairly large unofficial exports of cassava to neighboring countries, in particular R.P. Congo. It is well known in Brazzaville that most of the chikwangue, a basic food staple derived from cassava, comes from Zaïre.

A study published in 1986 by Prof. Joseph Houyoux (ICHEC -Brussels) and BEAU-Kinshasa showed that the average consumption of food in Kinshasa was 16.7 kg in 1969, 16.1 kg in 1975 and 16.9 kg in 1986. This study is based on household budget surveys done in these respective years. Cereals, bread and rice are increasing in importance, going from 10.6% of the household expenditures to 14.2% in 1986. Thus, rising food imports mostly compensate for reduced domestic food production and keep the per capita and per year availability of calories virtually constant. The income elasticity for the consumption of cereals is about one; for starchy food (roots and tubers) it is very low, about 0.10.

The stagnation and/or decline of the agricultural sector is well known and well documented in reports of the DOA. The factors that contributed to it are as follows, in summary :

- the zairianisation measures of 1973 and the disinvestment that took place, especially in Zaïre's export crop sector
- lack of private investor confidence in agriculture
- strongly negative protection of the agricultural sector as a result of macro-economic policies, particularly until 1983 i.e. direct government intervention in marketing; price controls and cheap food imports, overvaluation of the currency, extensive smuggling and a multitude of taxes on agricultural produce
- deterioration of Zaïre's interior transport network
- lack of support services to agriculture, particularly in research and extension

With the liberalization measures of 1982/83, price and marketing controls were removed and the exchange rate was adjusted to more realistic levels. This discouraged commercial imports of food and induced a limited supply response in agricultur[illegible]eas which were well integrated in the marketing system. Prices [illegible]eal terms rose in these areas. As a result of liberalization, the government also abolished implicit transport subsidies on the national river transportation system resulting in a reduction in commercial food production in areas far away from major urban centers (cfr. liberalization studies done at SEP).

Because of the poor state of most of the interior road network and the shortage of trucks and spare parts, marketing costs are very high, thus inhibiting producers to increase marketed output. Domestic credit ceilings imposed to curtail inflation limited the availability of working capital for traders. Cheap imports of food, including food aid, continued unabated. Lack of agricultural inputs such as seeds, small tools and fertilizers also prevented increases in agricultural productivity. Because of the severe economic crisis, the government was confronted with soaring budget deficits and public agricultural sector expenditure went even down further, from about 3% of total expenditure in 1981-83 to 0.9% in 1984-86. In 1987, the public investment budget (PIP) in agriculture rose to 6% of PIP and the five-year development plan (1985-1990) calls for a shift upward to levels approximating 9% (World Bank Agricultural Sector Memorandum, September 26, 1988).

In this development plan (not yet published), Government's objectives are to achieve food self-sufficiency and to promote increased production of raw materials for local industry and for export. Efforts will be concentrated in development poles (foyers de developpment) i.e. areas already having minimal infrastructure or proven potential. A central theme in its plan is to rely heavily on the private sector and private resources, from private companies or non-governmental organizations. The government has declared that it intends to create a favorable framework for the agricultural sector, including the rehabilitation of the internal transport network as well as agricultural research and extension.

DIAGRAM 1 : GOVERNMENT DEPARTMENTS AND INSTITUTIONS INVOLVED IN AGRICULTURAL PLANNING AND BUDGETING IN ZAIRE

OFFICE OF THE PRESIDENT

COMITE DE CONJUNCTURE

CONSEIL EXECUTIF

PRINCIPAL GOVERNMENT DEPARTMENTS INVOLVED IN AGRICULTURAL PLANNING AND BUDGETING

- Département de l'Agriculture et du Développement Rural (Diagram E5)
- Département du Plan
- Département des Finances, Budget et Portefeuille

OTHER GOVERNMENT DEPARTMENTS WITH SOME INVOLVEMENT IN AGRICULTURE

- Département de la Santé Publique
- Département de la Condition Féminine
- Directorate of Prisons
- Département de l'Environnement

OTHER GOVERNMENT (AND DONOR) SUPPORTED INSTITUTIONS INVOLVED IN AGRICULTURE

Agricultural Research	INERA
	BNS
	PNM
	PRONAM
	PNL
	PNR
Agricultural Credit	Banque de Crédit Agricole
Nutrition	CEPLANUT

Source : DAVIES S. and LIPTON M., A New Start : Preconditions for a Food Strategy in Zaïre, Report of EC Food Strategy Team's Mission to Zaïre, I.D.S., Brighton, February 1985.

TABLE 1: DEVELOPMENT OF AGRICULTURAL SECTOR PLANNING IN ZAIRE, 1970 to 1985

Date	Plan	Objectives	Outcome
1970	Interministerial Planning Mechanism to prepare 10 year development plan	Self-sufficiency in basic foodcrops by 1980s. Increase agricultural production for processing and exports.	Never implemented.
1973	Zairianisation	Transfer of all foreign-owned agricultural enterprises to Zairian ownership.	All agricultural and agroindustrial enterprises transferred to national ownership (in 6-month period). Collapse of many enterprises.
1974	Nationalisation (or radicalisation)	State control over large agricultural and agroindustrial enterprises.	State control imposed through purposely-created parastatals. Decline in production and deterioration of equipment.
1975-6	Agriculture as priority sector	Regenerate agriculture with falling copper prices.	No tangible results.
1976	OADR organised symposium with donors to analyse agricultural sector		
	National Foodcrop Production Programme	Self-sufficiency in basic foods through policy of compulsory cropping.	Still national policy, but has never been successfully implemented.
	Retrocession	Return of up to 60% of Zairianised and Nationalised agricultural enterprises to former owners.	Some have been returned; many remain abandoned; scheme continues; as yet no compensation for expropriated property arranged.

DIAGRAM 2 : INSTITUTIONAL STRUCTURE OF THE DEPARTEMENT DE L'AGRICULTURE ET DU DEVELOPPEMENT RURAL

CENTRAL GOVERNMENT

Commissaire d'Etat
Secretaire d'Etat
Conseiller Principal du Cabinet
Secretaire Général

Cellule de Conception

- Direction des services généraux (Directeur)
- Direction de l'administration générale des projets (Directeur)
- Service d'études et planification (Directeur)
- Direction de la production végétale
- Direction de la production et santé animale
- Direction des marchés, prix et crédits de campagne
- Direction du génie rural
- Direction de la promotion rurale

REGIONAL GOVERNMENT

Inspecteur Regional de l'Agriculture et du Développement Rural (8)
Inspecteur sous-Régional (24)
Agronomes de Zones (133)

LOCAL GOVERNMENT

Agronomes de Collectivés (1 500 i.e. approx. 1 per collectivité)
Vulgarisateurs

Source : DAVIES S. and LIPTON M., A New Start : Preconditions for a Food Strategy in Zaïre, Report of EC Food Strategy Team's Mission to Zaïre, I.D.S., Brighton, February 1985.

Date	Plan	Objectives	Outcome
1978	Special Working Group on Agriculture	Review strategies for agricultural recovery. Explore possible areas for donor assistance.	Drew attention to sectoral problems but no change in government policy.
	(part of) Comité de Conjuncture (Prime Minister, Ministers of Finance, Budget and Portfolio, National Economy, Agriculture, Planning, Director of the Presidence, Governor of Bank of Zaire, President of ANEZA, Secretary General of UNTZa)		
	Establishment of Fonds de Relance Economique (now called Fonds de Convention de Développement)	Require enterprises to go into development agreements with the GoZ to promote agricultural expansion.	Still in operation but problems with GoZ disbursement of funds.
1979	Mobutu Plan	Importance of agricultural recovery highlighted. Preparation of public investment programme (PIP) including agriculture.	Statement of broad policy objectives only. Under PIP, existing agricultural projects screened for first time and many cancelled.
	Minimum Agricultural Programme (PAM)- outlined programme of activities for 1980.	Increase production of maize, rice and manioc.	Some steps taken but poor results against over-optimistic targets and under-financing.
1981	Privatisation	Privatisation of state enterprises and greater participation of private sector in agroindustry.	31 enterprises privatised, of which 27 agricultural.
1982/4	Plan de Relance Agricole Agricultural sector designated "la priorité des priorités".	Self-sufficiency in basic foods. Raise agricultural production through policy reform and encouragement of producers. Improve implementation of agricultural projects. Make clear agricultural plans and improve preparation and implementation.	Optimistic production targets not met.

Date	Plan	Objectives	Outcome
1982	Banque de Crédit Agricole established	To provide small farm credit, with starting capital of 25mZ. (Receiving proceeds of Development Convention Taxes since 1984)	As yet only lending to traders, at interest rates substantially below the rate of inflation.
1982/3	Liberalisation of Prices	Designed to raise producer incomes and stimulate surplus production. Renewed effort to privatise state marketing enterprises created in 1974.	Effects still unknown for much of Zaire; positive impact on production where market access not hampered by other obstacles.
1983	Cellule de Conception created	Cabinet-level planning unit responsible for elaboration of overall agricultural policy and preparation of monthly agricultural reports.	Most responsibilities transferred to Service d'Etudes et Planification in DADR in 1983. Produce regular agricultural reports.
1983/5	Interim Economic Recovery Programme	Restatement of need to promote agricultural production to offset economic crisis and effects of structural adjustment.	

Sources: DAVIES S. and LIPTON M., A New Start : Preconditions for a Food Strategy in Zaïre, Report of EC Food Strategy Team's Mission to Zaïre, I.D.S., Brighton, February 1985.

B. Formulation and Implementation of Agricultural Policy - Budgeting Procedures

As the World Bank's memorandum on the agricultural sector (September 26, 1988) describes it, the public administration in services related to agriculture is rather weak. First, responsibility for the agricultural sector is shared among four different ministries (next section). This requires a significant amount of managerial resources already in short supply in Zaire. There is also a need to ensure continuity in decision-making which is made difficult by the frequent change of Ministers. Furthermore, as a pressure group in the competition for scarce budgetary resources, the Ministry of Agriculture is weak and has a low visibility. Second, by all standards, civil service salaries are extremely low, resulting in low morale, lack of career development opportunities and absenteism. Third, with the severe budget pressures, the recurrent budget has suffered the most. Late release of the budget further compounds the problem. Fourth, the dialogue between the private sector and the public sector in agriculture has been difficult leading to suspicion on both sides.

The lack of recurrent budget has been taken up in part by externally - financed projects. Some donors however tend to by-pass the public administration and set up autonomous project authorities, which ultimately lead to overlapping and a dispersion of effort.

The DOA has primary responsibility for agricultural planning and policy implementation. Diagram 1&2 suggest that the DOA has a comprehensive institutional structure, but in reality it operates under forbidding constraints.

Since 1970, the GOZ has introduced a series of agricultural plans and policy initiatives aimed at reversing the decline of the sector. These are summarized in table 1 drawn from DAVIES and LIPTON (1985). As the "Outcome" column shows, agricultural planning initiatives over the last fifteen years have either been only partially implemented or have been implemented with bad results.

The Plan de Relance Agricole 1982-84 advocated, a.o., the creation of a think tank or Cellule de Conception which was duly set up in 1983 as a Cabinet-level planning unit in the DOA. It had overall responsibility for elaboration of overall agricultural policy and for preparing monthly reports on agriculture for presentation to the Comite de Conjoncture. In November 1983, many of the Cellule de Conception's tasks were handed down to SEP. The Cellule now has little input into policy-making, meeting only infrequently. SEP is building up an analytical capacity for planning and policy making and receives support from USAID under project 660-0119, Agricultural Policy and Planning. SEP is now making a significant

input into agricultural policy making and implementation. Its director, who has recently been appointed Secretaire d'Etat of the DOA, used to preside over all technical agricultural mixed commissions with donors. In this capacity, he assume responsibility for donor coordination and agricultural polic elaboration. However, this also led to a tendency to treat projects as a substitute for planning and policy. There is a real danger in Zaire that projects substitute for policy and planning. Projects need to be integrated in planning, so that they can complement the coordination of national level policy initiatives.

In terms of planning and policy-making, the Departement du Plan (DOP) is responsible for coordinating all development-oriented activities. In theory, it should plan and define development policy at the macro-level.

Unfortunately, the DOP has very limited capacity to carry out its functions; it has hardly any money to spend or to influence. The Departement des Finances, Budget et Portefeuille (DOPBP) has major responsibility for budgeting and investment and coordination with the DOP is informal and weak. In macro-economic decision-making, the Bank of Zaire has more influence than the DOP.

As Ministers are changed regularly, their influence is short-lived and thus lacks consistency. It is thus not surprising that the Bank of Zaire and the Office of the President make major policy decisions, often not well coordinated with the various Ministries. As such decisions are discussed in the Conseil Executif, only a powerful presence of a Minister in this conseil carries weight in the government.

As the capacity to analyze and to plan for medium-and long-term agricultural sector policy making and implementation is strengthened at SEP, institutional links will have to be developed more intensively between various parts of the government involved with this matter, in particular, the DOP, the DOFBP, the Bank of Zaire and the Office of the President. The key to any successful long term agricultural sector policy making and planning lies in clearer procedures to allocate and to deliver timely and sufficient domestic resources to agriculture and in the acquisition of sufficient leverage in the DOA to increase the aggregate levels of allocations to agriculture. At present levels, very little is possible except the integration of donor supported projects into planning so that they can complement national level policy initiatives and provide useful experimental examples. However, projects are a poor substitute for policy.

Regarding budgeting procedures, the DOA has several budgets:

- the budget ordinaire (B.O.) : this covers missions of civil servants, small equipment purchases, office supplies etc. This is usually a very small budget, and only a fraction of it (usually around 10-20%) is actually disbursed
- the subsidies: this includes all project related funds, mainly from donors, including expenditure on rural roads and agricultural inputs. This is by far the largest item in the B.O. and the percentage disbursed is usually quite high
- the budget d'investissement : this budget item is now on the increase as part of the structural adjustment policies supported by the World Bank. It is called PIP (programme d'investissement prioritaire) and its disbursement has improved over the years.
- the budget pour ordre : this is a budget item which can be reallocated, upwards or more usually downwards, from one day to the next by the Conseil Executif (C.E.). This makes planning very difficult. Its purpose is essentially to provide the C.E. with flexibility to assign funds rapidly to particular problems.

Additional sources of funding for agriculture come from :

- Fonds de Convention de Developpement : these funds are to be provided by the private sector for devevelopment purposes. Most large private companies have now initiated their own development projects, usually in agriculture, and are thus able to control and use these funds directly e.g. UNIBRA uses these fund to finance GENAGRO which is active in North Shaba (ESTAGRICO), around Isiro and on the Bateke plateau
- Counterpart Funds : from sale of food aid (e.g. P.L. 480). The GOZ considers these funds as its own and includes them in the budget pour ordre. They are particularly important at USAID
- Fonds agricole : this was an export tax on agricultural products (mainly coffee) which was used by the DOA as a slush fund. Under the structural adjustment program, this tax has been eliminated.

There are also other local sources of funding raised through local taxation. Reference is made to the World Bank supported study ZTE/COGEPAR : "Etude de la competitivite de l'agriculture zairoise face aux produits agricoles importes" of June 1987. Much of these funds go to road maintenance. The World Bank is now using its leverage to harmonize these taxes, abolish them where appropriate and centralize the administration at the Departement des Finances.

The multitude of budgets does not make agricultural planning easier and it is in fact very difficult to determine the part of the GOZ budget which goes to agriculture. If expenditure by other Ministries is taken into account, and if road maintenance and

rehabilitation is included, it is probable that total GOZ expenditure in agriculture approaches 5%, as the GOZ claims. Current GOZ spending in agriculture in a strict sense, excluding roads and other Ministries, is closer to 1% and has been decreasing over the last few years.

Given the importance of agriculture in Zaïre in terms of employment, contribution to GNP and potential share in exports, the GOZ should probably spend 10-20% of public-sector current outlays there and also support much more of the investment budget in order to foster strong economic growth based on agriculture. A few African countries are also doing so. Strongly increased domestic resources for agriculture would undoubtedly foster sustainability of donor-financed agricultural projects such as PNS or PMKO and would create an environment in which agricultural supporting services and infrastructure would nurture rapid agricultural growth.

C. Divisional Responsibilities for Agricultural Policy Oversight

Diagram 1 sets out the government departments and related institutions involved in agricultural policy planning and implementation. Responsibility for the agricultural sector is shared among four different ministries : Agriculture - Rural Development, Lands, Environment and Conservation of Nature, and Scientific Research.

The Ministry of Agriculture has six directorates : General Services, Studies and Planning, General Project Administration, Livestock, Crops, Markets and Credit. The Ministry of Rural Development includes two directorates : Rural Infrastructure (rural roads and irrigation), and Rural Promotion (cooperatives). Forestry and fisheries are under the Ministry of Lands, Environment and Nature Conservation, and agricultural research (INERA) is under the Ministry of Higher Education and Scientific Research. In addition, the Regional Inspectorates of Agriculture promote agriculture and rural development activities in the field (except for centrally supervised development projects), and are administratively responsible to the regional governors.

RAV was created as a project by arrêté interdépartemental No 0001/85 of December 10, 1985 in the Ministry of Agriculture and Rural Development. The project was placed under the direct control of the Minister of Agriculture and Rural Development as far as implementation is concerned. Regarding scientific programming, it is the Ministry of Scientific Research which has responsibility. The follow-up of the project is jointly under the General Project Administration Directorate (DAGP) of the Minsitry of Agriculture and the Scientific Coordination directorate of the Ministry of Scientific Research. Finally, the coordinator of RAV is a head of division of the DOA.

II. Institutional linkages and support

A. Linkages between RAV and GOZ institutions

1. INERA

RAV and INERA operate in the same research stations. This co-habitation has been the source of a number of conflicts. Since the signing of the convention between RAV and INERA on November 27, 1984, relations have improved.

Actually, INERA has 2,213 employees (as of 20.10.88), all of whom are sous-statut i.e. paid by the civil service (fonction publique). RAV has only 68 employees sous-statut out of a total of 1,027 employees. This discrepancy has been a source of friction between the two institutions. Actually, salary scales at INERA are now better than those at RAV whose scale and primes were not adjusted upwards since July, pending a USAID directed reduction in the total size of staff by 240 people (assainissement). Usually, the reverse situation prevails whereby RAV - net salaries are better than those at INERA. Moreover, operating funds and facilities are usually much better at RAV than at INERA. In addition, RAV-researchers have the opportunities to continue their studies in the USA at MSc or PhD level. All this means that RAV is usually the envy of INERA. The proposed World Bank project at INERA my change the situation (Annex 20 on INERA & 21 on INERA restructuring).

In the past, RAV has proposed that a National Research Council (Conseil National de Recherche) be created at the DOA to coordinate agricultural research with INERA. There has been no follow-up on this proposal.

In the RAV research stations, problems have arisen in the past because of shortages of housing, offices and land, particularly at M'VUAZI. INERA, as a landlord and user of the facilities, does not pay its dues to RAV e.g. INERA has never paid its electricity bill at M'vuazi.

Some de facto collaboration exists. Certain RAV-varieties are being tried out in INERA-research stations in the North. Certain facilities are shared e.g. library, dispensary, personnel services etc. RAV top management sits at the Board of INERA and RAV has been consulted in the drawing up of the master plan (plan directeur) of agricultural research at INERA. The section of the plan on food crops is almost identical to what RAV has programmed for the future (Annex 32, 33 and 34).

Part of the friction between RAV and INERA stems from a concept that RAV is only one of the many projects at the DOA while INERA is the national structure for agricultural research in the country, covering all crops and all regions.

This exact concept has been the root cause of the demise of INERA in the past. Some have called it gigantism, others named it a bottomless pit. INERA has stated repeatedly that it cannot exclude any regions from its research as it is a national institution which has to be represented everywhere. RAV can choose and set its own priorities because it is "only" a project. Thus, INERA de facto assumes a supervisory and control function as it is the guardian of a national research mandate for all crops. However, INERA knows that it does not have the scientific capability and the human capital at this time to assume its national role. INERA has even expressed a desire informally, during the visit of the Evaluation Team, to make an agreement with RAV which would ensure that RAV scientists can assume scientific supervision in all of the 9 INERA stations. Such an idea is probably not workable and not very practival on a national scale. However, RAV should assume this role for its crops and for the stations where it is based.

Relations between RAV and INERA can be described as those of neighbors, one of which is the landlord, the other one being tenant. Both have to share certain facilities. From time to time, tensions emerge and flare up until they subside and some cooperation grows up. They have learned to live with each other without really feeling that they belong to the same family.

2. Other Organizations

RAV collaborates with many PVO's, cooperatives, NGO's and governmental organizations in its outreach/extension activities. This consists mainly of the distribution of improved varieties, the extension of improved agronomic practices and the training of extension personnel. These activities are described in detail in the Outreach Report.

RAV has preferential relations with other USAID-supported projects, in particular PNS, PCS and PROCAR. However, there have been some complaints that RAV is not doing enough multilocational trials and on-farm research in the areas of these projects. As discussed elsewhere in the Evaluation report, RAV has been operating under financial constraints and has had a lack of vehicles for travel over long distances. It is suggested that if projects want RAV to operate specifically within the project area and for the project's benefit, then the project should pay RAV for it at full cost. In any case, RAV should maintain scientific responsibility over the experiments, even if they are carried out by the project's own personnel. Project's often do not realize that RAV has a large mandate and has to cover a very large area of Zaire under tough constraints.

Relations between RAV and BUNASEM are particularly important since BUNASEM has national responsibility for seed certification, multiplication and distribution. Seed standards have been drawn

up but they are not yet enforced, pending the completion of the seed laboratories. Since BUNASEM operates primarily via private companies and PVO's , it is with these organizations that RAV collaborates directly. It supplies foundation seed, advises on recommended varieties and can provide training for its staff.

With respect to RAV's foundation seed, there has been criticism about the quality of the seed which RAV furnishes. This is particularly so for PNM and to a lesser extent PNL. Germination rates have sometimes been below standard, seeds are sometimes irregular and impure. This is related to the lack of facilities at PNM : there is no cold storage of seed and all grading and sorting is done manually.

If BUNASEM's seed certification becomes operational, it is foreseen that RAV will have to upgrade its standards for foundation seed. This will require more facilities and equipment. Presently, RAV's image is not served by the sale of foundation seed which is below standard.

For the future, the World Bank is preparing a national agricultural extension project based on a modified training and visit scheme. Central in such a scheme are the subject matter specialists and the existence of a backlog of farmer tested and proved superior technologies. Only RAV has at this time a range of improved, farmer tested varieties of its mandate crops and a set of recommended cultural practices. Thus, collaboration between RAV and the national extension project will be imperative. With this project, outreach/extension at RAV will be facilitated but at the same time, there will be increased demands made on RAV for improved technologies. Ideally, the subject matter specialists in the national extension project would come from RAV for the three crops or group of crops : cassava, maize and grain legumes. However, they need to be supported and their salaries paid from the World Bank project.

B. The ISNAR Report and the Restructuring of INERA - The Scope for Unification of INERA and RAV

The demise of INEAC in the turmoil of the post-independence period is well known and will not be repeated here. In 1970, there were plans to rehabilitate INEAC and it was renamed INERA, the Institut National pour l'Etude et la Recherche Agronomique. In the early 1970's, Belgium had Oery ambitious plans to relaunch INERA from Yangambi. The Zairisation abruptly stopped Belgian support and because of shortage of human, financial and management resources, INERA remained a huge, non-performing research organization with large overhead costs.

In the meantime, PNM in 1972 and PRONAM in 1974 were started in the DOA to address some of the more urgent problems in maize resp. cassava production.

The supervisory ministry (tutelle) of INERA had changed frequently. Initially, it was under the Office of the Presidency, then under the Office of the Prime Minister, followed by the Ministry of Agriculture and Ministry of Scientific Research, before finally becoming part of the Ministry of Higher Education and Scientific Research in 1983.

In 1983, RAV was conceived to revitalize the National Commodity Programs for maize, cassava and grain legumes and a high-level inter-ministerial study group was established to analyze the problems of agricultural research and make recommendations. The study group, which worked under the guidance of the President's Office, was assisted by ISNAR and received financial support from USAID.

In December 1985, RAV was formally created under the joint tutelle of the DOA and the Department of Scientific Research. RAV was created as a project in the DOA, under the authority of the Ministry of Agriculture for implementation and under the authority of the Ministry of Scientific Research for the programming of research. A convention was signed with INERA on November 27, 1984 to use INERA stations as a research base and to promote relations as good neighbors (Annex 22 on the creation of RAV).

The ISNAR report was published in February 1985. The report identified problems in three interrelated areas - human, financial and institutional - as being fundamental to INERA's poor performance. It concluded that they needed to be addressed simultaneously, with emphasis on structural and organizational issues and administrative improvements.

USAID in 1985 diagnosed three obstacles to change at INERA on the occasion of the visit of the Presidential Agricultural Task Force to Zaire:

(i) national pride in the institution that had acquired an international reputation for excellence, has inhibited consideration of more modest approaches which could be realistically considered;

(ii) nostalgia on the part of the Belgian Cooperation has led to proposals that seek to reestablish the institution as it once was;

(iii) INERA's reputation among donors as a bottomless pit capable of absorbing unlimited resources and as having a limited outlook for eventual establishment of the institution as a sound productive entity.

INERA makes very little contribution to agricultural research in Zaire because of:

(i) lack of financial resources;

(ii) infrastructure and equipment which has been allowed to run down

(iii) isolated research stations, without modern facilities, with large overhead costs and unable to attract good staff;

(iv) inadequate, unrealistic and overambitious administration and research programmes;

(v) lack of an overall framework to coordinate research in Zaire;

(vi) lack of commitment from the GOZ to agricultural research and to agriculture;

The main recommendations of the ISNAR report were:

(i) on the administrative level, to transfer INERA's headquarters from Yangambi to Kinshasa and to organise management practices;

(ii) to reduce INERA's research stations from 20 to 9 and evaluate the research potential of these 9;

(iii) to restrict Yangambi's operations to agricultural research and trim its infrastructure to fit research needs and evaluate future needs and costs;

(iv) to establish a research programme committee within INERA's Direction Generale, also with responsibility for hiring staff;

(v) to improve links with other relevant departments.

On the question of the relationship between RAV and INERA, the report recognizes that the National Programs were created because of the lack of credibility of INERA and because of some urgent problems in maize and cassava production.

The solution which is proposed is an unification process which culminates in the ultimate integration of the national programs in INERA after that INERA itself has been profoundly reformed.

In September 1985, the GOZ approved the study group's recommendations. Some progress has now been made on the implementation of these recommendations, although follow up was

very slow. The transfer of INERA's headquarters to Kinshasa and development of an action plan to restructure agricultural research became conditions of the Structural Adjustment Credit negotiated with the World Bank in 1987. The Bank is now taking an active role in the coordination of donor support for INERA's restructuring and in the drawing up of a long term master plan for agricultural research with phased implementation. In this, they are supported by FAO/UNDP which make a senior technical adviser available (from CIRAD, France). USAID is financing an extensive financial audit of INERA and financially supports self help measures which induce policy changes such as the transfer of headquarters from Yangambi to Kinshasa, the procurement of office and field equipment and vehicles.

The proposed World Bank project on agricultural research has a national scope and in a first phase will focus mainly on establishing of a research structure and institutional framework, management support, priority activities, staff training and minimal investment needs for research facilities. The tentative financing plan has a total budget of $50 million of which $20 million from IDA, $5 million from UNDP, $20 million from other donors (Italy, Belgium, USAID, Canada) and $5 million from the GOZ.

The problem with the restructuring of INERA as supported by the World Bank and other donors is that organisation, administration and infrastructure development take precedence over a clear indication of substantive research priorities. Future research content, crop-mix, regional coverage, balance between food crops and export crops, large and small farms etc. are vital issues which need to be addressed in a master plan.

It is our belief that INERA is only viable and sustainable if tight priorities are set and adhered to which will keep the overall effort manageable and which will lead to concrete, location specific results for high priority areas. Substance and aims should determine organization, infrastructure development and financing of INERA, not vice versa. A national master plan is being drawn up covering all crops, livestock etc. on a national scale. There still does not seem to be a sense of prioritising. In this, they seem to be supported by the World Bank which is also embarking on a national extension reform along the training and visit system.

The relationship between INERA and the national programmes has always been ambiguous and rivalries between the two are always just beneath the surface. Apparently, some RAV staff has recently been applying for a job at INERA, attracted by higher salary scales there and the prospect of generous World Bank financing. The former adjoint technique of RAV has recently been appointed scientific director of INERA. The worst scenario that could happen is that the World Bank or other donors give INERA a bit of money to dabble in RAV crops research at RAV research stations, in

competition with RAV. This could be a costly error that could make both go down the drain. The best scenario is one where a pragmatic division of labor leads INERA to a generation of its research capacity on cash crops (cotton), export crops and animal husbandry, including the rotation with food crops, and whereby RAV continues to concentrate its efforts on the basic food crops, including farming systems research and long term resource sustainability. If in addition to this division of labor, INERA can be brought under the tutelle of the DOA, integration of the two will be made all the more easy. In such an integration, the commodity based national programs can and should still maintain their autonomy. It is in this respect encouraging that INERA also plans to create national commodity based research programs, linked to extension, with sufficient autonomy to inspire donor confidence and cost-effectiveness.

In case the best scenario materializes, with or without a change in tutelle of INERA, a time frame of 5 to 10 years will be necessary to carry out the needed adjustments. It took nearly 3 years to complete the so-called ISNAR study. It took another 3 years to implement the recommendations and the implementaion is still under way. There are no short cuts. The building of sustainable institutions is a slow, evolutionary and costly step-by-step process which may take decades rather than years. This should not discourage decision makers and donors. The important thing is step by step progress towards a sustainable national institution.

In this respect, the position which the national authorities at the highest level of the DOA and INERA defend is still the position taken in the ISNAR report of 1985 (p.25) ie. an unification process which ultimately culminates in the integration of the national programs in INERA after INERA itself has been profoundly reformed. The authorities also agree that the reform process at INERA has just only begun. They are also confident that with World Bank and other donor financing and competent leadership at INERA, rapid progress can now be made.

The key to the long term viability of agricultural research in Zaire lies in showing the GOZ that agricultural research and the dissemination/
outreach of its findings is a vital component of accelerated economic growth in the economy. If the GOZ is serious about agriculturally based economic growth and self sufficiency in food, its committment to agricultural research must be guaranteed by increased financial support. It is only in this way that a sustainable national agricultural research capacity can be created.

Recommendations

1. It is recommended that USAID continue to finance self help measures at INERA which induce policy changes which lead towards an unification process and a sustainable national institution in the long term.

2. It is recommended that USAID takes an active role in the donor coordination group which meets regularly at INERA; cost-effectiveness, division of labor, prioritising, substance and aims should be the major themes brought up by USAID, not national coverage nor infrastructure development.

3. USAID has a comperative advantage in the training of agricultural scientists in the USA. The World Bank's proposed project is rather weak and spotty in this area. It is suggested that USAID assumes leadership in this area. To that effect, USAID could make some fellowships for MSc and PhD training available to INERA as part of the World Bank project.

III. SUSTAINABILITY

On this particular subject, the evaluation team is fortunate to be able to draw on two excellent studies/papers :

- the study by Edgar J. ARIZA-NINO for Robert R. NATHAN ASSOCIATES INC.: "Market oriented Crop Improvement-Research and Outreach-Enchancing Financial Sustainability" of July 30, 1988.
- a USAID discussion paper : "Agricultural Research in Zaire: USAID/Kinshasa's Role", dated March 23, 1987.

The arguments developed in these studies will not be repeated here in detail although reference will be made to them frequently.

A. Criteria for sustainability

Sustainability of RAV can be examined from different angles i.e. in terms of :

- institutional stability (robustness) and integration in Zairian structures
- dependence on external financing and viability in the absence of external funding
- human capital formation and the ability of RAV to retain its human capital
- the quality of RAV-research, the impact of its research findings on food production and the respect for its research mandate.

Each one of these four criteria will now be examined in detail :

1. Institutional stability and integration in Zairian structures

By and large, RAV is still a discrete project situated in the DOA with working relations with the national institution mandated to undertake agricultural research in Zaire, i.e. INERA. Reference is made to Section II. A. of this report on linkages between RAV and GOZ institutions, in particular INERA, and on the scope for unification of INERA and RAV. If all goes well with the restructuring of INERA, an unification of the national programs of RAV with INERA, while maintaining their autonomy financially and scientifically, is possible within a time frame of five to ten years. This is what the Zairian authorities at the highest level see down the road for RAV and INERA. If the unification process proceeds, INERA will probably concentrate on export and cash crop (cotton), livestock and basic research services while all food crop research will be directed to RAV. An overall agricultural research coordination mechanism will be necessary to coordinate the unified structure (INERAV ?). If this structure can be moved back into the DOA, it will enhance donor financing.

It can be argued that the tangible research results which RAV is producing have stimulated GOZ-authorities to further the restructuring process of INERA and to model the "new" INERA after RAV in terms of commodity based national research programs linked with extension. One high ranking Zairian official stated that RAV is years ahead in terms of food crops research over other countries in AFrica; another expressed the wish that RAV could go on for ever. Clearly, no one concerned at this stage in time wants to abolish or terminate RAV as a project or make it disappear into INERA. In fact, it is up to INERA to make tangible progress in restructuring, research programming, upgrading of its research facilities and implementation of a realistic research program before the unification process can really start. This is now widely accepted in Zaire and in terms of moving towards sustainable institutions, this is a major step forward.

Again, it is repeated here that the building of sustainable institutions is a slow, evolutionary, step-by-step process, with no short cuts, which will be very costly. Zaire has now the unique advantage of having experimented in all directions with its key agricultural institutions. Important lessons have been learned, capable and responsible Zairian staff are now in place and the time may have arrived to make a real start with the building of sustainable institutions.

In the long term, the most important contribution which RAV will make for agricultural research in Zaire is human capital formation i.e. training of Zairian researchers, technicians and extension workers. There is no doubt that RAV-scientists in the future will assume scientific leadership in many areas at INERA and will make

up its core of scientific staff. At present, INERA has only one maitre de recherches (MR) (senior researcher), 12 attachés de recherche (AT-R) (researchers) and 44 assistants de recherche (AT-2,-1) (junior researchers).

One of the key features of INERA is its autonomy. Although it is formally under the tutelle of the Ministry of Higher Education and Scientific Research, INERA operates very much on its own, governed by a Board (Conseil d'Administration) in which various Ministries, RAV and the private sector are represented, and managed by a president-delegue general (PDG) which has the status of a political authority just as in the case of parastatal companies (e.g. REGIDESO, SNEL, Office des Routes etc.) or offices (OZAC, ONATRA etc.). This give INERA a large degree of autonomy to elaborate its plan of work and implement it. Thus, INERA enjoys flexibility and autonomy of action. This also means that the PDG of INERA has extensive powers and bears tremendous responsibility. Moreover, there is no guarantee that effective leadership at the top can be maintained in the future. Thus, INERA's autonomy is a tremendous asset but at the same time makes the institution vulnerable as a result of possible changes in its top management. Unless INERA develops a track record of continuing, effective and compentent leadership, unification of all agricultural research into INERA will jeopardized.

2. Dependence on external financing and viability in the absence of
external funding

This report is only concerned about the sustainability of the local currency costs of the program which in principle were to be supported by the GOZ. The foreign exchange costs for IITA's technical assistance, training and overseas procurement are considered as long term investments.

RAV is completely dependent financially on the support of USAID for about $2.5 million a year in foreign exchange for technical assistance, training of 35 scientists in the USA and the purchase of equipment and commodities. In addition, USAID spends annually the equivalent of between one and two million dollars in counterpart funds to cover all local currency expenditures. The GOZ supports 68 staff of RAV through the civil service and provides them with a base salary (agents sous-statut); there is also a small operating budget (B.O.) and occasionally a small investment budget. In terms of total operating budget, excluding salaries of personnel sous-statut, but including all primes and salaries of personnel sous-contrat and all operating costs, USAID assumed in 1988 98% of all costs, the rest being supported by the GOZ.

Although the GOZ according to the project paper was to assume gradually a larger share of the local cost of the project, this has

not happened for a variety of reasons, the looming economic crisis and the lack of serious commitment being the most important ones. Thus, RAV is almost completely dependent on external financing and viability in the absence of external funding is virtually nil.

At present, RAV employs 1,027 persons of which only 68 are sous-statut, i.e. paid by the civil service. It has been decided by USAID that RAV has to reduce its work force with 240 persons in order to save on personnel costs. Of the 68 persons sous-statut, 13 are in central coordination, 24 in PRONAM, 5 in PNL and 26 in PNM.

By contrast, INERA had as of October 20, 1988, a total 2,213 persons, all of which were sous-statut. Moreover, the salary scales of INERA's employees are equivalent to those at the universities since February 1988 which are better than those of the civil service (Fonction Publique). RAV's salary scales for its employees sous-statut are those of the DOA (see Annex 20 on INERA).

All employees of RAV are paid primes from counterpart funds to top up their salaries, a practice which is common in Zaire for donor supported projects. Salaries for persons employed by RAV under contract (sous-contrat) and primes for personnel sous-statut and sous-contrat in 1988 make up about 60% of RAV's local budget (in Zaire), up from 30% in 1985. Elsewhere in the report (Project Management and Administration), it is pointed out that RAV's research and outreach programs suffer from a severe financial constraint. Thus RAV more than ever before depends on external financing (USAID) for its operations.

RAV estimates that if all its personnel could be sous-statut, a budgetary saving in the counterpart budget could be made on the order of 30%.

INERA is in the process of shedding most of its redundant stations as recommended in the ISNAR study. This also includes the commercial plantations and factories of Yangambi. Yangambi still employs 945 persons out of a total for INERA of 2,213 i.e. nearly 43% of its work force. At present, there are only 21 scientific and 38 technical staff at Yangambi but 886 administrative and manual workers. Together with Ngazi which is mainly a commercial rubber plantation 30 km North of Yangambi which employs 148 persons, the restructuring of INERA whereby commercial plantations are transferred to the private sector on a rent/management basis (contrat location-gerance) will enable INERA to cut back its work force with at least another 1,000 persons. Since all these persons are sous-statut, ample room will be created in the national budget of agricultural research to absorb most of the RAV-staff sous-statut. It should be remembered here that INERA at the start of the ISNAR study employed over 5,000 persons.

Recommendations :

1. The GOZ should make a concerted effort to bring RAV personnel sous-statut at the same time that INERA is being scaled down. There is no reason why all of INERA's personnel should be sous-statut while only 7% of RAV-staff is sous-statut. At least all A1, A0 and higher level RAV-staff should be brought sous-statut. This must be a condition for later unification with INERA.
2. Efforts should be made for the RAV-personnel sous-statut to be paid according to the same salary scales as those applicable at INERA. The Project 091 PP explicitly states that RAV-salaries should be similar to those of IFA i.e. the university. The university salary scales are the same as those at INERA since Februaru 1988 (cfr. annex).

3. Human Capital Formation

An outstanding feature of RAV is its human capital formation as explained in the Training Report. However, when the participant trainees return from overseas training, they will seriously strain the RAV budget and RAV logistics: housing, vehicles, office space, etc. Since the salary supplements (primes) are a function of the diploma of the researcher, each returning trainee causes the RAV's operating budget to be increased. If this is not the case, since personnel costs are incompressible, less and less funds will be available for other operating expenses such as travel, supplies etc., i.e. for research.
Presently, RAV is largely dependant on USAID funds. The long-term viability of RAV and of an agricultural research capacity is based on the capacity of RAV to train and retain able Zairians. This will in the future determine the sustainability of agricultural research. Some attrition of staff is unavoidable and it is expected that some of the returning MScs and PhDs will end up with INERA and World Bank supported projects. In this capacity, they will hopefully serve their country and be a good return on the investment which has been made. However, RAV must make a determined effort to retain a core of dedicated and able Zairian scientific staff such that the initial investment remains profitable for RAV. Without the retention of a core of scientific staff, there is no future and no sustainability for RAV. In this context, it should be pointed out that one of the key factors in the success of the NCRE project in Cameroon is the ability of IRA (the national agricultural research organization) to retain returning MScs and PhDs. Countries like Indonesia and Thailand in Asia have been able to retain over 90% of the returning MScs and PhDs in agricultural research, thus enabling the departure of expatriate scientists. Each MSc represents an investment of at least $50,000, each PhD $100,000 or more!

The paramount importance of the retention of Zairian MScs and PhDs returning from overseas training can be illustrated by the case of

maize selection and breeding at PNM, keeping in mind that PNM was started in 1972, i.e. 16 years ago.

Maize Improvement at PNM

Central in any maize improvement program program is maize selection and breeding. It is through maize selection and breeding that high yielding varieties with good resistance or tolerence to diseases, pests and stresses are developed. This is not to say that improvements in agronomic practices are not important. However, it is the belief of the team that quantum improvements in maize yields and in labor productivity over the next decade will only be possible through the extension and adoption of such improved varieties. Experience at PNS supports this argument and also points to the importance of improvement in marketing infrastructure (cf. evaluation of the impact of PNS, February 1987).

Presently, there are 3 maize breeders at PNM:
- the director of PNM, Dr. Mulamba Ngandu-Nyindu (PhD)
- Ir. Kanku Shambuyi (MSc): is already on a "permanent vacation" and is actively searching for a new job
- Dr. Kenric M. Johnson, principal advisor, IITA.

As the director of PNM has major administrative duties, responsibility for selection and breeding rests with Dr. Johnson, who is only on technical assistance with PNM. Furthermore, no Zairian scientists are planned to go on training or are in training for PNM. This jeopardizes the sustainability of maize improvement at PNM.

In the RAV training program, a total of six participants are scheduled to be trained in breeding, one at PhD level, three at MSc level and two as yet undetermined. The earliest estimated completion date is in June 1990 for the three MSc breeders.

Recommendations:
1. It is recommended that at least one, and preferably two of the Zairian MSc breeders are placed at PNM when they return in 1990 from overseas training.
2. The expatriate maize breeder at PNM must remain there until at least 1991 and preferably for all of the second phase of RAV.

Need for a Continuation of Human Capital Formation

Human capital formation is a continuing process. Not only should RAV retain its human capital, it also has to expand it and to replace it. Thus, there needs to be a continuing stream of young, intelligent and motivated Zairian scientists who leave for overseas training at MSc and PhD level. This is made necessary because of the weaknesses of the Zairian universities, in particular IFA at

Yangambi. Proposals have been made in the Training Report for overseas training during the second phase of RAV.

4. The quality of RAV-research, the impact of its research findings on food production and the respect of its research mandate

One of the best guarantees for the sustainability of RAV is the quality of its research results and the impact they are having on food production. These issues are discussed in the Report on Technical Issues and Outreach. RAV varieties of cassava, maize and grain legumes are being adopted by farmers through NGOs/PVOs and other organizations and they are having an impact on food production. No detailed studies on the rate of adoption or on the impact of RAV-varieties on food production, incomes, nutrition etc. have been carried out. Thus, it is nearly impossible to make quantitative statements about these issues.

Suffice it here to state that the Zairian authorities which the team consulted seem to be fairly pleased with RAV's research results, particularly in terms of varieties released and extended. In terms of improved agronomic practices which have been extended, the record is less encouraging. Biological control of cassava pests, particularly mealybug, appears to be very successful, although no quantitative data on its impact could be collected. Little progress has been made in the research of farming systems and in the area of resource management i.e. viable cropping systems which are sustainable through alley cropping, agro-forestry, mulching, controlled fallowing etc.

It should not be forgotten that RAV concentrates on the small, resource-poor farmers. Thus, some agro-industrial firms or companies have been frustrated by RAV for not addressing their problems in terms of mechanization, weed control, soil fertility, hybrid varieties etc. This is particularly true for large maize farms in Shaba region. Although PNM, together with IITA, is working on superior high yielding hybrid maize varieties, no such varieties have yet been released. Release is however foreseen in 2-4 years.

In terms of respect for RAV's research mandate, the recent creation by the GOZ of a "Centre de Recherche sur le Maïs" (CRM) at Gécamines - Développement and the subsequent eviction of PNM from the Kisanga research station is a case in point which demonstrates the fragility of Zairean agricultural research structures. An extensive description and analysis of this case is found in Annex 13 .

B. Inadequate Budgetary Support from the GOZ and Possible Approaches to Deal with It

Until now, this support has been minimal and, in recent years, the share of operating expenses covered by the Government's contribution Budget Ordinaire (B.O.) has been decreasing in real terms. In 1987, the B.O. covered only 3.8% of operating costs. The same budget in nominal terms was maintained for 1988. Obviously, for the long term sustainability of RAV, the Government must assume financial support for the project.

A long term continued effort must be made to demonstrate the value of agricultural research and to influence policy makers to give it a higher priority in the national budget. In a country like Cameroon, up to 1.3% of agricultural value added is spent on agricultural research. Zaire spends one of the lowest percentages of its agricultural value added on agricultural research of all countries in Africa and in the world. It shares this reputation with countries like Guinea, Sierra Leone, Ethiopia and some others.

Part of the problem is that over the last five years, agriculture has been getting progressively less and less of the national budget. It now receives less than one percent of the B.O. of the GOZ if the B.O. of the DOA is taken as a yardstick. The usual explanation given by DOA officials is manyfold:

(a) Zaire is suffering a severe economic crisis and is under tight budget restrictions of the IMF. This seems to contradict with the annual rate of inflation which now hovers around 100% and which is fueled by the creation (printing) of money. Obviously, the control of the monetary supply is out of hand and this contradicts with a tight budgetary policy.

(b) Zaire receives a lot of donor support for agriculture and rural development. Together with the medical and health sector, this is an area where donor funds are easily forthcoming. The same cannot be said for, e.g. the departments of justice, internal affairs, social affairs etc. Therefore, it seems logical that the GOZ is not spending much in the agricultural sector.

(c) Although agriculture has often been declared as being of high priority, the bottom line is that agriculture does not have a high budgetary priority with the GOZ. By and large, it is still seen as a backward sector, and as a sector of the economy which will not be able to accelerate economic growth and foster development in the country.

A key question is then how this negative perception of the agricultural sector as a source of accelerated economic growth, employment and income creation, even in the short term, can be changed and turned into a positive one. How can political support be mobilized to invest in the basic agricultural institutions and in agricultural development? The answers to these questions are not going to be easy. Building up support for agricultural development is going to be a slow, evolutionary, step-by-step

process just like stengthening of the core agricultural institutions in Zaire will be a slow, evolutionary and costly process.

Possible approaches to deal with this fundamental problem of building up political support for the key agricultural institutions and agricultural investment, and in particular agricultural research are:

(a) a dialogue with the GOZ and the major donors, particularly the World Bank, on a larger share of the governmental budget for agriculture as a condition for continued and expanded external assistance for this sector

(b) fiscal reform and the issue of sustainability of agricutlural research and of other key agricultural institutions (sensibilisation). With respect to fiscal reform, there are only about 11,500 taxpayers in Zaire, private companies and individuals inclusive. Only three civil servants in the Ministry of Finance are in charge of enlisting new taxpayers. Thus, the taxable base in Zaire is extremely narrow.

(c) better coordination of GOZ efforts in agricultural research, particularly with respect to the role of INERA, Gecamines-developpement (CRM), DOA and with respect to multidonor coordination of support

(d) case studies of African governments which have successfully used their own resources with donor assistance to fund agricultural research, to become self-sufficient in food production and to foster economic growth and development based on agriculture. Possible condidates are Cameroon, Zimbabwe, Malawi, Ivory Coast

(e) case studies of the success of agricultural research and extension in Sub-Sahara Africa. Possible condidates are:
- hybrid maize research in Zimbabwe and Kenya
- biological control of cassava mealybug by IITA
- maize streak virus resistance as developed by IITA
- the PNAP program of successful potato research in Rwanda
- the role played by high yielding maize varieties (Kasai 1) in bringing maize production from 30,000 t to 90,000 t over a period of ten years in PNS, together with improved marketing infrastructure and institutions
- research on high yielding maize varieties by C.R.I. in Ghana, with assistance from CIMMYT, and its extension by the global 2000 project

Table 1: Estimated Internal Rates of Return to Agricultural Research Expenditures

Commodity	Country	Study	Time period	Internal rate of return (%)
Maize	U.S.A.	Grilliches (1958)	1940-55	35- 40
Sorghum	U.S.A.	Grilliches (1958)	1940-57	20
Sugarcane	India	Evenson (1969)	-	60
Wheat	Mexico	Ardito-Barletta (1970)	1943-63	90
Maize	Mexico	Ardito-Barletta (1970)	1943-63	35
Cotton	Brazil	Ayer (1970)	1924-67	77
Maize	Peru	Hines (1972)	1954-67	25- 40
Maize and cultivation package	Peru	Hines (1972)	1954-67	50- 55
Rice	Columbia	Ardila (1973)	1957-72	58- 82
Rice	Columbia	Scobie (1978)	1957-74	79-101
Rice	Asia	Evenson (1978)	1960-75	75-102
		Aggregate Studies		
All agriculture	U.S.A.	Evenson (1968)	1949-59	47
All agriculture	India	Jha & Evenson (1970)	1953-71	40
Crops	Mexico	Ardito-Barletta (1970)	-	45- 93
	International	Kislev and Evenson (1973)	1955-68	
Applied research	LDC^S			42
	DC^S			21
Agriculture scientific research	LDC^S			60
	DC^S			36

Source: Senegal Agricultural Research Project Preparation Report by IADS, July 1979.

This list is not exhaustive but may help to develop a more positive attitude towards agricultural research and extension by focusing on a number of success stories.

It is generally accepted that a strong national agricultural research system integrated into the rural development process, with problem-oriented research focussed on farmer's needs, can make an important contribution towards improving the lot of the rural population through improving the quantity, quality and productivity of food, as well as cash crops. To a large extent, however, only in extreme cases would private entrepreneurs engage in agricultural research, especially in developing countries, since research results cannot often be marketed as private goods. Thus, it devolves on governments to invest in research to maintain and improve growth in the agricultural sector. Government involvement is also necessary to: (i) generate cooperation between researchers; (ii) direct research to meet national needs and objectives and in the appropriate direction; (iii) meet the large capital outlays which may prove excessive for the private sector; and (iv) create an effective institutional framework in which research forms part of the crop production system, and to avoid the research effort being spread too thinly between a multiplicity of ministries, institutes and projects.

Table 1 drawn from a World Bank report gives an overview of the estimated internal rates of return to Agricultural Research Expenditures. Unfortunately, not one of the cases listed refers to Africa. There is a dearth of such studies concerning African agricultural research.

C. Enhancing Financial Sustainability at RAV

The results of agricultural research in developing countries are commonly viewed as a public good with large positive externalities thus justifying public or donor financing. The inability of private operators to "privatise" the results of agricultural research and to sell them through the marketplace results in sufficient private resources which could be invested in agricultural research. Studies on the rates of return of investments in agricultural research around the globe (table ...) show that these returns are extremely high and that such investments are among the most profitable which governments can make. However, no such case studies exist for subsaharan Africa.

The inability of private operators to capture the results of agricultural research and sell them in the market place has many reasons:

a. the nature of agricultural research results is such that they can be easily copied and repeated: proprietary control of the results is difficult or impossible. This is what is called in

economics "the free rider problem". The exception to this is hybrid maize varieties. Many believe, including CIMMYT (cfr, 1986 report on maize seed production), that hybrid maize development and sale of the seeds is a prerequisite for private seed companies to survive. Moreover, yields of hybrid maize must surpass open-pollinated varieties by at least 30%.

b. most smallholder farmers or peasants in developing countries are poor, have no access to credit, and cannot pay in cash for the results of research (seeds).

c. agricultural research results are always uncertain and unpredictable. Moreover, it is very difficult to estimate the potential seed market in a developing country. Therefore, the private sector is not keen on investing in agricultural research for food crops because of uncertain results and an uncertain market. In addition, research requires expensive personnel and is costly.

d. the time lag between investment and research findings, as well as between findings and adoption, is uncertain and depends, a.a., on government policy.

e. research results and its application may have beneficial society wide secondary impacts which do not pass through a market place and cannot be captured easily e.g. improvements in the nutritional status of children, reduction in the workload of women (the reverse may also be true !), multiplier effects in the economy, beneficial effects on the environment (or the reverse), creation of employment and other social benefits.

f. research usually adds to the pool of knowledge necessary for subsequent research efforts and for education. The private sector is not much interested in the broader implications of research.

The foregoing explains why financial sustainability should not be sought after at the level of 100%. However, this does not mean that RAV should not make efforts to enhance financial sustainability, e.g. at 20 to 40% of total budgets.

Special Purpose Taxes for Agricultural Research

In terms of special taxes or levies which could be used to finance agricultural research, the general tendency now in Zaïre is to reduce the number of special purpose taxes and to centralize collection at the Ministry of Finance. This is also the position defended by the World Bank in Zaïre.

If candidates are sought for as special purpose taxes, one possibility is a special research tax on beer. A one Zaïre tax on every bottle of beer sold in Zaïre would more than pay for all of

RAV's esxpenses. One of the main ingredients in beer production in Zaire is maize, together with other cereals such as rice, sorghum and limited amounts of imported malt and hops

Total beer production in Zaïre over the last five years has been as follows :

1983	304 million liter
1984	370 million liter
1985	422 million liter
1986	428 million liter
1987	--- million liter

Source : Conjuncture économique No 26, October 1987, p. 349

Beer production and consumption increases regularly and is based on agricultural products. Moreover, the consumption of beer should not be encouraged.
Thus, a small tax could be appropriate, particularly since beer is still cheap and the brewery business is known to be quite profitable. However, increasing the price of beer is a political matter and the evaluation team cannot propose this item as a recommendation; the collection, transfer and disbursement of similar special taxes has in the past been the subject of many irregularities (cfr. report by Ariza Nino).

Some Suggestions for the Enhancement of Financial Sustainability

Drawing from Mr. Ariza Nino's study and other sources, the following suggestions can be made to enhance financial sustainability at RAV :

- open pollinated seeds of maize do offer some limited scope for the financing of agricultural research, although it is questionable if private seed companies can survive on such seeds (cfr. Central Shaba evaluation report). However, hybrid maize seeds do present opportunities (cfr. section on CRM and the sustainability of RAV). RAV should charge its clients of foundations seeds much higher prices (cfr. Ariza-Nino report) in order to enhance financial sustainability. At the same time, RAV should upgrade the quality of its foundation seed. RAV should concern itselves with the marketability of the research results.

-for cassava cuttings, a more realistic price should be charged by RAV to its customers (cfr. Ariza-Nino report)
- the concept of remote, self-contained research stations such as M'vuazi, Kiyaka, Gandajika needs to be re-examined in light of the high cost of maintaining infrastructure, social services, utilities etc. Reference is made to a proposal for shifting two-thirds of cassava, maize and groundnut research from M'vuazi to a new

research base (not a station) in or near Kikwit for Bandundu region. This could be an important testcase and set a precedent.
- when development projects such as those financed by USAID or the World Bank approach RAV for the provision of technical expertise, village-level tests, multilocational trials etc., RAV should in principle cooperate with such projects at full cost basis, including overhead charges (cfr. report by Ariza-Nino).
- cost-effectiveness should always be kept in mind, particularly with respect to the hiring of personnel. In many cases, occasional labor (journaliers) are much cheaper than contract labor. The total size of RAV-staff should be scrutinized and objective criteria should be laid down for the hiring and keeping of personnel. There seems to be an imbalance between the total number of personnel at PRONAM compared to the two other programs.
- occasional labor in Zaïre is usually much cheaper for certain field operations than mechanization with heavy tractors.

D. Conclusion :

In Zaïre, agriculture offers the best prospects for sustained economic growth in the short and medium term. It has been well established in the development literature that widespread use of appropriate farmer-tested technology is the key to increased agricultural production, employment generation, productivity increases and income growth.

Thus, the development of a strong technological base is the cornerstone of agricultural growth, either through an increase in the productivity of labor in land abundant countries or through an increase in the productivity of land in labor abundant countries or through a combination of both, as is most likely in a country like Zaïre.

Regarding sustainability, an USAID discussion paper dated March 23, 1987 lists three options :

option one:	develop a cost effective research organization coupled with an agreed plan for funding by the State after donor participation ends
option two:	develop a cost effective research organization and fund it as long as it seems to be useful to support growth in the agricultural sector
option three:	phase out RAV since there will be no long term sustainability and find some other source of technology for the agricultural sector.

Only option one and two can be realistically considered. Pragmatically, there might be an option which is intermediate between one and two, say one bis.

Option one bis would include an agreed plan by the GOZ to move most of the RAV-personnel to the sous-statut position, in line with the further scaling down of INERA as redundant rsearch stations and personnel are being shed. At the same time, salary scales at RAV for sous-statut personnel would move upwards to the INERA scales. These two moves would already save 30 to 40% of current RAV operating costs. Then, better marketing of foundation seed, cassava cuttings and on-farm research in large donor supported projects could also contribute t the generation of net income and thus operating funds (cfr. report by Ariza Nino). Investment funds for existing INERA-research stations could be saved for establishing a research base in or near major cities (Lubumbashi, Kikwit, Mbuyi-Mayi, Kinshasa) with several experimental plots (or farms) in the major ecological areas with only a very light infrastructure. At the same time. a light presence would be maintained at the INERA stations for certain experiments, multilocational testing, multiplication etc. along the Kiyaka-operation. RAV personnel could probably be cut back further, particularly at PRONAM. In the end, RAV will be a much leaner organization, with higher mobility, cost-effective and results-oriented.

Finally, without increased GOZ support for agricultural research, there is no long term future for agricultural research in Zaïre. Donors cannot be expected to fund agricultural research singlehanded for ever. If the GOZ is serious about self-sufficiency in food and agriculturally led economic growth, its commitment to agricultural research must be guaranteed by increased financial support.

ANNEX 8

TRAINING

1. Long Term Training

A. Introduction

As the main purpose of the project is to improve and expand the ability of the DOA to undertake applied agricultural research activities and to transfer agricultural technology needed to increase village cultivators production of food crops, investment in human capital in Zaire is of paramount importance. The creation and expansion of a Zairian capacity for applied agricultural research and its firm establishment in a sustainable institution is the main longterm challenge of the project. If this challenge is met successfully at project completion, one of the main determinants of long term growth and development of the agricultural and food sector in Zaire is then set positively.

The original project paper of 1983 and its 1987 supplement call for a training component of 14 PhD and 20 Masters candidates and short term training amounting to $2.7 million out of a total foreign exchange cost of $15 million, i.e. 18%.

As shown in Annex 30, 35 participants have been identified and are actively pursuing or have pursued MSc and PhD degrees. The last 12 participants left in October 1988 and are now in the U.S.A. in intensive language training. Four MSc participants have returned to Zaire, one of whom did not receive his degree and is planning to leave RAV. Another MSc agronomist recruited at PNL has refused to reintegrate into RAV and works in the private sector. At present, 9 candidates are enrolled for a PhD. Together with the Zairian researchers who have completed their studies with USAID financing under prior food crop research projects this is an impressive effort in human resource building.

While the long term training component is now completely under way, it is out of synchronization with the assumptions of and planning for Project 091. The PP assumed that the trainees would be returning in time for the IITA scientists to be able to serve as their mentors.

This has not occured. 27 of the 35 participants will not return until just before or some time after the end of Project 091 on 30 September 1990. Thus IITA will not have been able to perform one of the major functions contemplated in the PP and one of its objectives will not have been met. This is a constraint on the objective of having a full trained Zairian cadre in place will not be achieved. In the planning for any follow-on phase, it is recommended that the project design analyze what continuing

technical assistance is required to train these returning Zairian scientists. Paragraph F on p 5 of ths report.

It has proven difficult to obtain qualified candidates from within the project and the DOA. This is more a reflection of the weakness of the Faculty of AGriculture (IFA) at Yangambi, the only such institution in Zaire, to produce well trained Ao graduates than a criticism of RAV. IFA is suffering from poor infrastructure, desertion of academic staf, lack of laboratory and in field training and a general decline in the quality of university level agricultural education. Unless the GOZ, with the cooperation of donors, faces up to the lingering crisis situation at IFA, no improvements can be expected in the quality of Ao personnel which RAV engages for its research. A recently started World Bank projet (PRESU) is now addressing the problems at IFA, together with 11 other institutes of higher education, including the three universities of Zaire.

The USAID Kinshasa mission authorized in December 1986 the training of participants of A1 level (3 year higher technical agricultural training at Bengamisa near Kisangani). These candidates are to be admitted to a U.S. university to complete a fourth year required for a Bachelor degree and then continue for a Masters degree. The Training Advisory Committee of RAV has now selected one candidate on a test basis to be trained using this route. Unfortunately, Bengamisa suffers from many of the same problems as IFA - Yangambi. Only exceptional candidates will succeed for a Masters degree at U.S. universities because of deficiencies in their training at Bengamisa, particularly in the basic sciences and mathematics. It is to be expected that these candidates will require more years to earn a masters than foreseen and that the failure rate will be higher.

It appears that there are no shortcuts to improving the quality of Ao level agricultural education in Zaire. This probably requires establishment of a new agricultural faculty within the existing universities located in a major city in order to attract and retain qualified professors and adequate laboratory and field experimentation. This issue is outside the scope of the RAV - project and the present evaluation. It is however a major constraint which impedes human capital formation for agricultural research in Zaire.

B. Attrition

PRONAM started in 1974 and was followed by the cassava outreach project before RAV took over. Three PhDs and 16 MScs were trained. Of the Phds, 2 are at PRONAM, the third has been recently appointed scientific director of INERA. Of the 16 MScs, 4 left RAV.

Since PNM started in 1971, 12 Zairians have been trained in the USA at Masters (9) and PhD level (3). Only 4 are presently at RAV, one PhD (director of PNM) and three MSc. Of these, two are presently in the USA for PhD training and one is in the process of leaving RAV. Of the two PhDs who left PNM, one is presently working for SAFGRAD in Burkina Faso, the other one is at the Department of Higher Education and Scientific Research in Kinshasa. Of the 9 MSc's, only 2 are presently with PNM, both of whom are now pursuing a PhD degree in the USA. Those who left are with INERA, Gecamines Developpement, the Department of Plan etc. Most of the departures tool place between the end of the CIMMYT project in 1981 and the start of the RAV - project in 1985. With the USAID supported legume project at INERA - Mulungu, two Mscs were trained and they are now with RAV/PNL.

Thus, from past experience it appears that attrition rates are fairly high, about 50 percent. Possible explanation are:

- relatively low salaries at RAV dspite the payment of primes and degree supplements. For instance, salary scales at INERA are presently better than at RAV. However, the p.d.g. of INERA told the team that a lot of RAV staff have already applied to INERA for transfer or recruitment. This probably has something to do with the advent of the large World Bank project at INERA. Historically, there has been very little movement towards INERA. The private sector has salary scales which are usually considerably better than at the DOA. Some governmental institutions also have better salaries e.g. DAIPN at Kinshasa.

- difficulty of RAV scientists in acquiring sous-statut status

- isolation of RAV research stations away from major urban centers, except PNM

- difficulty of returning degree participants to get their salary adjusted in line with their acquired qualifications.

- low morale at RAV, particularly at PNM and PNL.

- lack of equipment, vehicles and supplies to carry out high quality research. This is mainly due to problems in procurement.

- lack of operating funds for travel and field visits.

- lack of fringe benefits at PNM such as the service of a car outside working hours and fre housing. Before the arrival of DAIPN in Kinshasa, PNM researchers had free housing at the statin. Since then, they have had to find housing in Lubumbashi and pay for it, except for the director of PNM whose house is being rented by PNM.

C. The Selection of Candidates

Clear policies and guidelines have been established for participant nomination and selection for degree programs in the U.S. Step by step procedures were written for coordination of selection, development of PIO/Ps, coordination with USDA for language training, university placement, monitoring and departure and travel arrangements (Annex 30). A policy was developed and adopted concerning approval of research to be performed and location of research. A candidate must be nominated by a member of the Training Advisory Committee, usually the director of PRONAM, PNL and PNM. Participants who go to U.S. universities have to sign forms which ensure their return to RAV after the completion of their studies for an equal amount of time as their length of stay aborad. During their stay in the USA, their families continue to receive their RAV salaries and fringe benefits.

D. Distribution of Skills

U.S. training discipline distribution (Annex 30) seems fairly well balanced. The FSR discipline needs to encompass basic training in agronomy. It is also understood that the training in crop science includes agronomy. Only three participants are being trained in agricultural economics. The attrition rate among these is expected to be very high, given the great demand for agricultural economists in Zaire.

Two Zairians have received short term training in management. This is one discipline which needs more attention in the future. The RAV coordinator, Mr Mota Bakajika assisted at two management workshops in Lubbock, Texas in 1986 and 1987 and Wanzalughendo Musavuli and Mr Mota had management training at the University of Pittsburgh.

E. Recommendations

In the future, more attention needs to be given to improving management skills of RAV staff and in particular the program directors and administrative assistants.

For a follow-on phase of the project, it is recommended that at least 12 participants be sent for training in the USA. The distribution of skills is suggested to be as follows:

- 5 agricultural economists at MSc level, 2 of which who could continue for a PhD
- 3 extension specialists (extension agronomists)
- 3 MBA's with particular emphasis on research management
- 1 rural sociologist

F. External Technical Assistance in Support of Returning Trainees

Most of the MSc traines will return to RAV in 1989 and 1990. Apart from the rural sociologist who will return in 1988 or 1989, the PhD trainees start returning in 1990 i.e. when the first phase of the RAV project is ending. with the return of Zairian PhD's, the need for external technical assistance will be greatly reduced. The 14 IITA positions approved under phase 1 could be scaled down to 4 or 5 but the need for short term visiting scientists from IITA still remains for all of a follow-on phase. This is particularly true for germplasm selection, on-farm research methodology, on-the-job training of junior scientists and specialized skills such as biometrics, plant physiology, integrated biological control of pests etc.

The disciplines for which resident external assistance is still requested and recommended in a follow-on phase are:

- PRONAM
  - one breeder/agronomist
  - one FSR specialist (national level)
  - one extension agronomist/agricultural economist
- PNM
  - one breeder/agronomist
  - one extension agronomist/agricultural economist

Thus, the team foresees the need for continuing external scientific resident support, although at a reduced level than that of the first phase.

G. PhD Thesis Research in Liaison with RAV/IITA

For MSc candidates thesis research is conducted in the USA on a subject which should be relevant to RAV's research program. RAV should have a voice in the selection of research topics. For PhD thesis research, 10 professor visits and 10 students trips including maintenance for a period of up to 12 months is foreseen in the training budget. The total budget for PhD dissertation

costs is $142,500. It is recommended that PhD candidates choose their research subject in liaison with RAV. Moreover, at least a 6-months stay at IITA-Ibadan is recommended for research under the guidance of an experienced IITA researcher. IITA's Medium Term Plan puts great emphasis on such collaboration and IITA is able to defray part of the costs of residence at Ibadan. Such an arrangement would also foster continuing relations with IITA and would in the end help strengthen RAV. There is currently a feeling at RAV that IITA is not sufficently involved in PhD thesis research of Zairian students. It is recommended that IITA should take active steps to encourage Zairian PhD candidates in the USA to choose and implement their dissertation research in close collaboration with IITA and RAV.

2. Short Term Training

A. International Agricultural Research Centers

Such training took place at:

IITA-Ibadan in the following areas
- rapid multiplication - one participant
- alley cropping - four participants
- maize research and proiduction - three participants
- cowpea and soybean research and production - thirteen participants
- training of trainees - four participants
- entomology and biological control - three participants
- root and tuber crop production and research - six participants
- tissue culture - two participants
- weed control - two participants
- maize pathology - four participants
- physical plant services - one participant
- seed technology - two participants

CIAT (Rwanda)
- farming systems - two participants
- legumes crop training - seven participants
- bean agronomy - three participants

CIAT (Columbia)
- bean breeding - one participant
- bean agronomy - one participant

Regular visits from IITA research staff at Ibadan took place, particularly over the last two years. Visits were made by the following central IITA researchers over the last two years - Mutsaers, Fasjemisin, Smith, Spencer, Hahn, Herren, Neuenschwander, Nweke, Ezumah a.o.

In Annex 30, a list is given of all Zairian researchers and technicians who were in training at IITA up till 1986.

B. In-Country Training

Two intensive two-week workshops on Farming Systems Research On-Farm Research Techniques have been held for project staff at Mbanza-Ngungu (1988) in Bas Zaire region and at Lubumbashi (1987) in Shaba region. The proceedings of both workshops have not been published for lack of funds. A total of 27 staff members took part in these workshops, together with representatives from cooperating organizations. IITA staff from Ibadan participated and provided leadership in these workshops. Another workshop on Farming systems research is planned for 1989 in Mbanza-Ngungu. The training center and dormitory facilities (14 beds) at M'vuazi station were completed in April, 1985. The facilities are available and being used for outreach training and training of project staff. A total of 73 argonomes from various PVO's and the DOA have been trained at M'vuazi in sessions of one to two weeks. If possible, the sleeping capacity of the training center should be expanded to 30 beds.

- The PRONAM librarian had library training at the USIS library in Kinshasa
- Four RAV mechanics had training in Land Rover maintenance and repair at the Land Rover-dealership (INZAL), Kinshasa
- The PRONAM human resources manager had a course at CENACOF, Kinshasa in integrated administration of human resources. In turn, he conducted a training session on the subject at PRONAM for its staff
- Three staff members took a course at CENACOF/USAID in extension
- Many staff members had English language training at the Kinshasa and Lubumbashi American Cultural Centers

3. Training Newsletter

As a vehicle for communication with degree program participants in the U.S. and those who returned to Zaire, a training newsletter was begun in 1985 and nine issues were released. This newsletter increased visibility of the training component of RAV and gave recognition to those staff taking part in training. The newsletter was discontinued after the departure of the IITA director of training and outreach.

4. Constraints in Training

In February 1987, a training session at PNM was scheduled for all agronomes concerned with maize production in Shaba region. This would have been the first such training session of PNM/RAV.

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Invitations were sent out and about one-third of the trainees showed up. However, the director of PNM had to cancel the session for lack of funds. Thus, training of extension agents at PNM has not taken place.

The training budget of all three programs is centrally controlled at RAV Coordination at Kinshasa. Since August 1987, when Dr. Miller left there has been no Director of Training and Outreach in Kinshasa. It is recommended a director of training should be appointed without delay.

Suggestions

a. The training newsletter should be relaunched.

b. The dormitory facilities (for training) at M'vuazi should be expanded to 30 beds.

c. In a follow-on phase, major emphasis should still be put on training at all levels, including short term in-country training and training at the IARCs.

TABLE: PRODUCTION OF FOODCROPS IN ZAIRE, 1959-1986, THOUSAND M.T.

YEAR	MAIZE	(1) PADDY	SORGHUM	CASSAVA	SWEET POTATOES	BEANS	(2) GROUNDNUTS	(3) PLANTAINS	WHEAT	SOYBEANS
1959	333	165	-	7,214	316	72	176	-	-	-
1960	330	124	-	6,045	374	88	176	126	-	-
1965	232	49	-	7,785	192	76	137	447	-	-
1970	428	179	48	10,348	426	116	267	1,215	3.4	-
1971	436	184	48	10,329	432	121	279	1,266	2.2	-
1979	536	223	31	12,566	324	160	334	1,378	3.6	1.1
1980	562	234	32	12,800	333	162	339	1,408	3.7	1.7
1981	639	245	33	13,172	343	104	347	1,438	3.8	so
1982	666	261	34	14,184	363	111	349	1,467	12.1	3.6
1983	673	271	35	14,601	363	156	366	1,496	16.1	so
1984	704	286	36	16,286	373	164	375	1,526	9.8	4.4
1985	721	297	37	16,892	382	166	424	1,795	6.0	so
1986	729	274	-	-	-	-	443	1,834	so	4.7

Sources: Agriculture congolaise en tableaux statistiques, 1959-1968
Situation actuelle de l'agriculture zaïroise, 1987
Conjoncture économique, 1987

(1) the conversion rate of paddy to rice is about 60%
(2) non-shelled
(3) the production of bananas is estimated at 300 to 400.000 ton per year

ANNEX 9

IMPORTANCE OF THE RAV - CROPS

The production of the principal food crops of Zaire over the period 1959-1986 is given in the table following this page. Agricultural statistics are notoriously unreliable in Zaire. However, they do indicate an order of magnitude.

RAV embraces three commodity research programs in a farming systems research perspective with linkage to extension. They are:

PRONAM	for cassava based cropping systems
PNM	for maize
PNL	for grain legumes with, in order of importance: groundnuts, beans, cowpeas and soybeans

1. CASSAVA

Cassava is by far the most important food crop in Zaire. It is grown on about 50% of all cultivated land. It is roughly estimated that, on average, 60% of the daily intake of calories comes from cassava for two-thirds of the population. The importance of cassava as an energy source points to a nutritional problem because of lack of protein. It also illustres the dominant role which cassava plays in the daily life of Zaireans, in nutritional status and in food security.

Zaire, together with Congo and Gabon, has the highest per capita consumption of cassava in the world. Zaire is by far the largest cassava producer in Africa. On a world scale, it ranks third after Brazil and Thailand and is responsible for some 10% of the world production of cassava.

Since 1960, there are indications that cassava production has been growing at a faster rate than the population (2.7%). This has been done mainly by extending areas planted with cassava. In the more densely populated areas of Bas Zaire and Kwilu and particularly near the major roads, fallowing periods have shortened, soil fertility has declined and more and more cassava is grown as it produces the most calories per unit of land and per person day of labor. In many areas of Bas Zaire, cassava now comes as the first crop in the rotation; sometimes two cassava crops follow each other before the land is turned into a short grass fallow. As cassava still yields an acceptable production in poor soils or after a prolonged drought, it is the major household food security crop.

Cassava leaves are the most important vegetable and are an important source of proteins, minerals and vitamins all over Zaire. It is a major cash crop in Bas Zaire.

Cassava is consumed under various forms:

- sweet cassava is consumed as a vegetable, without processing, raw or after cooking; sweet cassava is usually grown in the compound farm near the house
- bitter cassava is consumed after processing into chikwangue, fufu (flour), cossettes, paste (kimpuka). By far most of the cassava grown in Zaire is bitter cassava
- cassava leaves are consumed as pondu, saka-saka and mixed with fish or meat in a palm oil sauce
- cassava and maize flour are mixed and consumed as bidia in the South and South East
- sweet cassava and plaintains are boiled and pounded to make lituma

Some cassava is used as animal feed and in the processing of textile fibers (mercerisation).

The major disease and pests of cassava are:

- cassava mosaic disease
- cassava mealybug: this is particularly a problem during the dry season and in the drier areas such as South Shaba where cassava has virtually disappeared because of this pest
- cassava green spider mite
- cassava bacterial blight
- cassava anthracnose
- cassava stem-tip dieback: this disorder was first discovered in Zaire and the etiology is not yet well-known

The importance of cassava in Zaire as the major staple food crop warrants its dominance in the RAV-project and the importance given to PRONAM.

2. MAIZE

Maize is the second most important food staple in Zaire, particularly in the derived savanna, lowland and highland savannas with adequate rainfall and abundant sunshine. It is the most important cereal crop in Zaire, particularly in the Kasai and Shaba regions. Imports of maize flour are still important, particularly illegal imports from Zambia and Zimbabwe. Official imports are around 35,000 tons and have declined from a maximum of 160,000 to 200,000 tons in the late seventies, particularly through donor supported integrated rural development projects in the major maize growing areas of Kasai and Shaba. It has been demonstrated that the PNS-project supported by USAID increased maize production in the North of Shaba from 30,000 to 90,000 tons over a ten year period.

Maize is also important in forest areas as green maize, consumed fresh or after cooking or roasting. In these areas, it is an important food supplement to cassava. Lack of sunshine and high humidity make the conservation of maize in these areas very difficult.

In the major maize growing areas, maize is processed into flour. Maize is also important as animal feed, particularly for poultry, and it is a major input in the beer breweries. Thus, there is an important industrial demand for maize.

There are strong indications that maize consumption is increasing in Kinshasa. Traditionally, only Zaireans from Kasai and Shaba origin consume maize flour. Because of the relative price advantage of maize flour over cassava flour and paste, more and more maize is being mixed into the diet. The breweries are also using ever larger quantities of maize. The demand prospects for maize are thus very good as a relatively cheap, nutritious basic food staple.

Major diseases and pests are:

- maize streak disease: this is major disease affecting second season maize or whenever maize is planted late. It is transmitted by leafhoppers (cicadulina)
- maize stem borers: this is a major pest in the more humid (forest) areas, particularly second season or late planted maize
- maize leaf blight (lowland and highland)
- termites

- a major threat to maize conservation in Zaire is the large grain borer (Phostephanus truncatus). This insect is already present in Burundi and Tanzania. It is probably already in some parts of eastern Zaire e.g. Kivu. It virtually wipes out stored, unshelled maize.

The importance of maize in Zaire and the size of the maize imports justify an important research activity on maize, particularly for the savanna areas.

3. GRAIN LEGUMES

A. Groundnuts

Groundnuts are the most important protein crop in Zaire. With an estimated production of about 450,000 ton in 1986, they play a vital role in the fight against malnutrition. Moreover, they are an important source of oil and vitamins (vit. A, D, E).

Groundnuts are particularly important as a source of protein for lactating mothers and children under the age of 4 years. CEPLANUT estimates that in Zaire more than 40% of the children between ages 1 and 4 suffer from malnutrition because of their cassava based diet.

Groundnuts are grown everywhere in Zaire but particularly in association with other crops such as cassava in the derived savanna and in the savannas on the lighter soils. They are an important ingredient of many local dishes and are consumed as a snack food between meals or with drinks in toasted form (arachides de bouche).

Between 1960 and 1985, production more than doubled. Because of their short growing period, suitability for intercropping and ease of preparation as a food, groundnuts are by far the most important source of vegetable protein in Zaire and warrant the research attention whic is given to it in PNL. For research on groundnuts, PNL is in contact with ICRISAT, however, the mandate of ICRISAT covers the semi-arid areas only of which Zaire is not part.

B. Beans (Phaseolus vulgaris)

Beans are the second most important protein crop in Zaire. They are also grown everywhere but particularly in the savannas and in the tropical highlands of Kivu region where they are of great importance. Although PNL focuses most of its attention on ordinary beans, some other bean species are also being evaluated such as various Vigna and Phaseolus beans (germplasm evaluation).

For the tropical highlands, testing and selection takes place at INERA-MULUNGU in Kivu region in collaboration with CIAT's bean

research program in Rwanda and Burundi and in the framework of IRAZ, a creation of the CEPGL.

Beans are always eaten in cooked form, together with starchy foods and vegetables. Since 1980, production has been more or less stagnant.

Beans play an important role in the balancing of the diet and help to combat malnutrition, particularly with children. Research on beans is of high importance at RAV.

C. Cowpeas

Cowpeas are a particularly important grain legume in Kasai-Oriental region. In other regions, they are part of the mixed cropping system but are of much lesser importance than groundnuts or beans.

IITA has particularly well succeeded in its research on high yielding, early maturing varieties of cowpeas, to be grown in association with maize, and resistant to insect attacks.

In Zaire, cowpeas always suffer from insect attacks and a pure crop of cowpeas only yields well with repeated insecticide applications. Its main importance is as a protein crop as part of a crop mixture where other food crops will be dominant.

If for budgetary or other reasons research in RAV has to be cut back, cowpeas will be a candidate. This is not to say that present research efforts are not commendable.

D. Soybeans

The production of soybeans has received a lot of attention from missionary organizations in Kasai region since 1965 and in Ubangi subregion (project CDI-Bwamanda) since 1970. It has been hailed as a miracle crop that could solve all malnutrition problems of Zaire. Despite its attention from well-intended PVO's, its production is estimated to be less than 10,000 tons.

Soybeans production faces a number of important constraints:

- most varieties do not nodulate freely with indigenous Rhizobia
- its growing period is longer than that of any other grain legume crop
- there are often problems with germinative power of the seeds

ANNEX 10

The Importance of

Other Major Food Staples which are not covered by RAV

1. Bananas and Plantains

Plaintains are particularly important as a staple food in the perhumid forest areas eg. Mayumbe in Bas Zaire and in parts of Equator and Haut Zaire region. They are often eaten after cooking and pounding together with cassava.

Bananas are grown nearly everywhere in Zaire in the wetter areas. They serve as a dessert food.

Very little reserch has been done on bananas and plantains in Zaire or in all of Sub-Saharan Africa. Up till now, bananas and plantains were grown without much problems. The critical issue is in the case of plantains the appearance in West and Central AFrica of black sigatoka disease. IITA is now initiating a breeeding program with first priority on resistance to black sigatoka. Cell and tissue culture techniques are used for preservation and exchange of germplasm and for rapid multiplication. This work will be carried out in close collaboration with INIBAP.

Bananas are of particular importance in the tropical highlands of Kivu region (Mulungu station). Research is underway at IRAZ on bananas, in liaison with INIBAP, which is relevant for the three member countries of IRAZ: Zaire, Rwanda and Burundi.

The EEC - European Development Fund has shown an interest in financing research on bananas and plantains at M'vuazi in Bas Zaire through the University of Gent (Belgium) as part of its large Bas Zaire agricultural project (40 million ECU). Work will probably start in 1989 or 1990.

2. Rice

Rainfed rice is of particular importance in hydromorphic soils of Bas Zaire (Mawunzi), in parts of Mai Ndombe subregion, in Mongala subregion of Equator, all along the Zaire River from Lisala to Kisangani and in Maniema subregion of Kivu around Kindu. Since the early 1980's, rice production has been stagnating in Zaire because of competition from cheap low grade broken Thai rice. The dominant variety is still R66 which was released by INEAC in 1958. Most of the seeds which are used are uneven and a far cry from the original R66 type.

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In the 1970's, Taiwan carried out some research on irrigated rice near Bumba. Their efforts were succeeded by a rice research team from the Republic of China which worked a.o. at Yangambi, Nsele, Bumba and Mbanza-Ngungu. The main focus was again the production of irrigated rice. In M'vuazi, one Belgian researcher is starting research on rice together with Zaireans of INERA under the scientific guidance of Prof. PELERENTS. He developed R66 at INEAC and subsequently O.S.6 (FAR06), which is still a dominant rainfed rice variety in Nigeria and which IITA uses as its check in its variety trials. O.S.6 was never released in Zaire because of the turmoil of independence.

Italy has agreed to support a major research program on rice starting in 1989. The agreement is about to be signed with the DOA. This is a 4 million US$ project, including construction of houses and facilities at Kiyaka which well be the major base for the Italian project. Other INERA stations where research on rice will be carried out are Yangambi (the most suitable location) and Bambesa in Bas Uélé. Part of the construction at Kiyaka will be financed via BUNASEM under the World Bank loan. Germplasm will be brought in from IRRI. Apparently, no contacts have been made with WARDA or IITA.

Although research on rice in Zaire is formally coordinated in the Programme National Riz (PNR) under the DOA, it appears that PNR encompasses only production activities with the Chinese project.

3. Sweet Potatoes and Irish Potatoes

Sweet potatoes are a major food staple in the tropical highlands of Zaire in Kivu. They are also grown all over Zaire in a crop mixture or in the compound farm as a food supplement. INERA is doing some limited research on sweet potatoes.

Irish potatoes are grown in the volcanic soils around Goma and Butembo in Kivu region where disease stress is not too high. They are mainly consumed by Europeans.

A lot of research on sweet potatoes and Irish potatoes is going on at ISAR in Rwanda and at ISABU in Burundi. ISAR has received massive assistance from the World Bank. CIP has had a very successful program in Irish potatoes in Rwanda. As a result, potatoes are now a major food staple in Rwanda and are even bought by the poorer families. CIP is also active in Burundi. IITA collaborated with ISAR in the selection and breeding of sweet potatoes. All research at the CGIAR on sweet potatoes has now been mandated to CIP.

Research coordination and exchange of research results on sweet and Irish potatoes occurs through IRAZ for the tropical highlands of the three countries.

The World Bank has recently shown interest in the financing of research on Irish potatoes in Kivu region, to be based at the INERA station of Mulungu near Bukavu.

4. Sorghum

Before the arrival of cassava in Zaire from South America through Portuguese explorers in the 16th or 17th century, sorghum was the major food staple of the indigenous population. Sorghum production is presently not very important. It is mainly grown in the tropical highlands of Kivu for the making of sorghum beer. However, sorghum can be grown in large parts of Zaire in the drier derived savanna and savanna areas. The breweries have shown an interest in the promotion of sorghum production as a substitute for imported malt. UNIBRA, the largest Zairean brewery, is promoting sorghum production on the BATEKE plateau near Kinshasa.

Conclusion:

The foodcrops not presently covered by RAV do not merit inclusion in the research program. Work is already in progress or planned on these crops, they are only of minor importance or they are region-specific to warrant inclusion in a national program and to divert resources from more important crops.

Current Agricultural Research Financed by Belgium

AGCD (Belgium) supported projects in agricultural research are:

- fruit trees, rice research and cropping systems at M'vuazi. This project was identified and is executed by the University of Gent (Prof. Pelerents). Actually, the major activity is the rehabilitation of the fruit orchard (50ha) at M'vuazi and the production and distribution of fruit trees. There are 3 junior scientists working on the project. In essence, it is not really a research project

- project "coton-vivres" at Gandajika. This project was identified and is excuted by the University of Gembloux (Prof. Demol). The main activity is the breeding and selection of new cotton varieties and the development of interspecific hybrids (Gossypium hirsutum x G. arboreum x G. thurberi). This is a longstanding research activity of Gembloux. Food

crops appear in the title of the project in order to make it more acceptable for Belgian financing. In fact, a /pure/ cotton project would have had few chances of being funded by Belgium since it was the colonial crop par excellence. A plant pathologist who also works on food crops makes up together with a cotton breeder the Belgium technical assistance team at Gandajika.

- logistical support to INERA. There are presently three Belgian advisors at INERA. Two are at the headquarters in Kinshasa, respectively in accounting and in technical support and one is at Yangambi (formerly at Bongabo, now privatised) to help with the divesture of the plantation. This logistical support is a carry-over from the time (1982-1986) the p.d.g. of INERA was father G. VANNESTE, a Belgian agronomist-priest.

Belgium has shown interest in supporting INERA's efforts to draw up a master plan for agricultural research under World Bank financing and to provide support for research on tree crops and for germplasm conservation.

It is important to point out that these projects except for the logistical support to INERA are Belgian university initiatives. They were negotiated with the DOA and come under the Belgian aid programme to DOA. The particular arrangement which stipulates all the project conditions and covenants was negotiated and signed by the DOA, although the research activity is located on an INERA station, similarly to RAV. INERA has no direct control over these projects but acts as the host institution in which the project is located.

The Rice Research Project supported by Italy and the World Bank

This project was identified in 1984 and is now expected to start in 1989. It focuses on research on rainfed rice in Zaire. The explicit objective of the project is to provide technical and scientific support to the /Programme National Riz/ (PNR) of the DOA.

Originally, the project headquarters would be in MAWUNZI (Bas Zaire). This site has, however, been recently privatized. It has now been decided to set up headquarters at the INERA station of Kiyaka. This will require infrastructural development, including the construction of five new houses. An important GOZ contribution for the payment of Zairean staff was also expected. It has now been decided that the World Bank will assume the costs of upgrading of infrastructure, local salaries and primes via their BUNASEM project.

Secondary stations for this project will be Yangambi and Bambesa. It is expected that the project will produce foundation seed for BUNASEM.

The Italian contribution to the project is about $3 million and the World Bank will put in $1 million. This is a ten-year project split up in phases of 3 years each. A total of 96 person-months of senior experts and 60 person-months of junior experts and technicians will be provided together with 22 person-months of short term consultants. Originally, the intention was to attach the program to RAV.

ANNEX 11

THE NEED TO INCREASE FOOD CROPS RESEARCH IN BANDUNDU REGION

In a study jointly undertaken by BEAU and the DMPCC in 1984 and 1985 on the food supply of the Kinshasa market, tonnages of basic foods transported by road to Kinshasa were estimated on the basis of a count of the number of trucks. These results were contrasted with a similar study done by FAO in 1974. The summary results are as follows:

Table: Estimated tons per year of basic foods transported by road to Kinshasa from Bas Zaire and Bandundu, 1974-1984/85

		Bas Zaire Road		Bandundu Road		Total	
		1974	1984	1974	1984	1974	1984
Cassava	Tons	73,400	41,000	70,900	84,400	144,300	125,400
	%	50.8	32.7	49.2	67.3	100	100
Cereals (esp.maize)	Tons	-	5,200	-	8,500	-	13,700
	%	-	37.9	-	62.1	-	100
Vegetables (esp. cassava leaves)	Tons	13,800	12,200	200	2,400	14,000	14,600
	%	98.6	83.6	1.4	16.4	100	100

Source: Approvisionnement de Kinshasa 1984-1985, apports par voie routiére essai de de synthèse, BEAU-DMPCC, janvier 1986

Preliminary results from the AGCD-KU Leuven project on the marketing of food crops in Bandundu over the period October 1987-June 1988 indicate a total production as follows:

Cassava: 3,659,882 t, 55% of which from Kwilu subregion
Maize: 262,974 t, 69% of which from Kwilu subregion
Groundnuts (unshelled): 134,235 t, 67% of which from Kwilu subregion

Similar figures will be available for Bas Zaire at the end of 1989. These results contrast with the official figures for 1985 of the DOA-SEP-Annunaire de Statistiques Agricoles 1979-1985:

Cassava: 2,602,700 t Bandundu; 711,000 t Bas Zaire
Maize: 109,800 t Bandundu; 20,300 t Bas Zaire
Groundnuts: 90,900 t Bandundu; 13,800 t Bas Zaire

The following table, drawn from Louise O. FRESCO's excellent book: "Cassava in Shifting Cultivation - A Systems Approach to Agricultural Technology Development in Africa", Royal Tropical Institute, Amsterdam, 1986, p.80 illustrates the foregoing. It shows the tremendous importance of the Kwilu via a vis the Kwango with cassava yields in Kwilu which are about double those of Kwango. In 1979, total cassava production in Zaire was estimated to be about 12,566,400 t fresh roots (annuaire des statistiques agricoles 1979-1985, p.47), of which 2,111,100 t from Bandundu. There is a huge inconsistency between L. Fresco's estimates and those of the DOA. It is our belief that reality is closer to the estimates of the K.U. Leuven - AGCD project.

Table Production, area and yield of the major food crops in the Kwango-Kwilu (1979) (calculated from Dept. of Agriculture figures[1]).

Crop	Kwango Volume (x 1000 t)	Kwango Area (x 1000 ha)	Kwango Yield (t. ha^{-1})	Kwilu Volume (x 1000 t)	Kwilu Area (x 1000 ha)	Kwilu Yield (t. ha^{-1})
Cassava (fresh weight)	891	113	7.9	5,368	366	14.6
Maize (grains)	43	52	0.8	193	181	1.0
Groundnuts (unshelled)	31	40	0.8	118	140	0.84
Rice (paddy)	1.4	2.3	0.6	27	32	0.84
Millet (*P. typhoides*)	2.2	2.8	0.8	36	51	0.7
voandzou, (vigna subterranea)	1.7	4.8	0.3	8.8	12	0.7
Sweet potato	5.2	1.2	4.3	49	9	5.4
(Irish) potato	0.2	0.6	0.3	0.4	0.07	5.7
Yam (various species)	12.3	1.7	7.2	38	8	4.7
Squash (various)[2]	3.2	14.2	0.2	79	144	0.55
Banana[3]	4.6	2.0	2.3	33	7	4.7
Sesame	-[4]	-	-	3.6	2.9	0.8
Beans (several species and genera)	-	-	-	0.9	1.1	0.8

Notes
1 Gross inconsistencies in the data have been adjusted where possible; figures have been rounded.
2 Presumably this concerns oilseed yield only.
3 Includes plantain.
4 No data available.

The official figures seem to underestimate agricultural production or, mutatis mutandis, agricultural production must have grown very rapidly between 1985 and 1987-88.

All the foregoing points to the increasing role which Bandundu is playing in the food supply of Kinshasa, particularly since the construction of the tarmac road from Kinshasa to Kikwit (525km). In Bandundu region, it is particularly Kwilu subregion which is expanding food production rapidly and which still has great potential. Field observations and secondary sources of information all point in this direction.

Production of basic food staples in Bas Zaire is constrained by the shortage of land, particularly because of the large agro-industrial estates on the best soils (Kwilu-Ngongo, JVL, etc.), and because of regional specialization in cassava leaves, bananas and plantains, beans, vegetables, firewood and charcoal, fruit, cattle etc.

This argument was already developed in the 1979 scope of work of USAID project 070 (agricultural sector studies) and was the basis of the projects 98 and 102 (PROCAR). These projects capitalize on the agricultural potential of the Kwilu subregion and represent a major investment in agriculture and in agricultural marketing development (total investment:± $23 million) in the subregion. It is from this subregion and from these investments that the growth in the food supply for the Kinshasa market will be forthcoming.

The conclusions to be drawn from the foregoing are that RAV and its three commodity programs and particularly PRONAM, should assume a much larger role in the development of agriculture in Kwilu. This is warranted by the growing role which Kwilu subregion is playing in food supply not only of the Kinshasa market but also for:

- the Brazzaville market: most of the cassava consumed in Brazzaville comes from the Kwilu and Mai Ndombe area and is imported via river boats without official control. There is virtually no commercial agriculture in the R.P. Congo apart from the state farms and the fertile NIARI valley near Loudima and NKAYE.

- the Kwango subregion: the Kwango region is covered by very poor Kalahari sand. It is sparsely populated (less than 5 persons/km2) but it has an important source of income via diamond mining. The Kwango has always been a food deficit area. Cassava prices in parts of Kwango are even higher than in Kinshasa. The Kwilu supplies most if not all of the food for the Kwango.

- the Kasai subregion. An important share of the food surplus from Kwilu finds its way to the Kasai, particularly maize and groundnuts.

Most of these facts are not well documented or known. Area familiarity, interviews and analyses of the K.U. Leuven project on the marketing of food crops for the Kinshasa markets, all corroborate these findings.

Unfortunately, nobody in RAV seems to be concerned with these macro-issues nor with a strategic review of food crops research in Zaire.

Nobody seems to be asking where the food supply for the major cities will

be coming from over the next 5 to 10 years. Such questions, however, need to be addressed as the answers to these questions

must guide present and future agricultural research policy in the country.

One could expect that the "plan directeur" for agricultural research would address these problems. The general tone and scope of work rather indicates national coverage of agricultural research, nationwide presence and the refusal to really ask the hard questions about short term and long term priorities and about the most cost-effective way of using very limited human and material resources available for the solution of some of the most pressing problems in terms of poverty alleviation, nutrition, food security and accelerated economic growth led by agriculture. The same mistakes will probably be made in the proposed World Bank supported national extension project which also aims at national coverage for several crops.

Upgrading of Kiyaka station or a New Research Base in Bandundu?

M'vuazi is located in a very fertile valley with alluvial soils. Its location was chosen in the colonial days mainly in function of research on fruit trees for the European and indigenous population. This explains the importance given to citrus, avocado, mango, mangosteen etc. at M'vuazi. It was never a major station for research on cassava. The major station for cassava breeding and selection was Yangambi. Moreover, new cassava varieties selected at M'vuazi are bound to perform poorly in the much poorer soils on valley slopes between Kasangulu and Matadi where most of the cassava is grown. Of course, M'vuazi is excellent for multiplication of cassava varieties because of its fertile soils. The major PRONAM varieties, KINUANI and F100, are not being accepted around M'vuazi as both varieties are really suited to the poorer soils.

In the preceeding section, a forceful argument has been made to increase food crops research for the Kwilu subregion. It is suggested that regarding cassava research actually taking place at M'vuazi, about two-thirds be transferred to Bandundu and one-third be maintained at M'vuazi. The same holds for maize research (PNM) and research on groundnuts (PNL) at M'vuazi. Research on beans and other grain legumes at M'vuazi could be maintained there at the present level.

Regarding Kiyaka, the major disadvantages as a research station are:

- inadequate infrastructure; poor access with 33km of tarmac road and 29km of dirt road requiring 4WD-vehicles in the rainy season
- lack of a permanent connection to the electricity supply of Kikwit
- high overhead costs
- isolation of the station; lack of social amenities

- difficulty of posting expatriate and Zairean staff at the station. Residence is usually in Kikwit city where there are schools, hospitals etc.

The advantages of Kiyaka are:

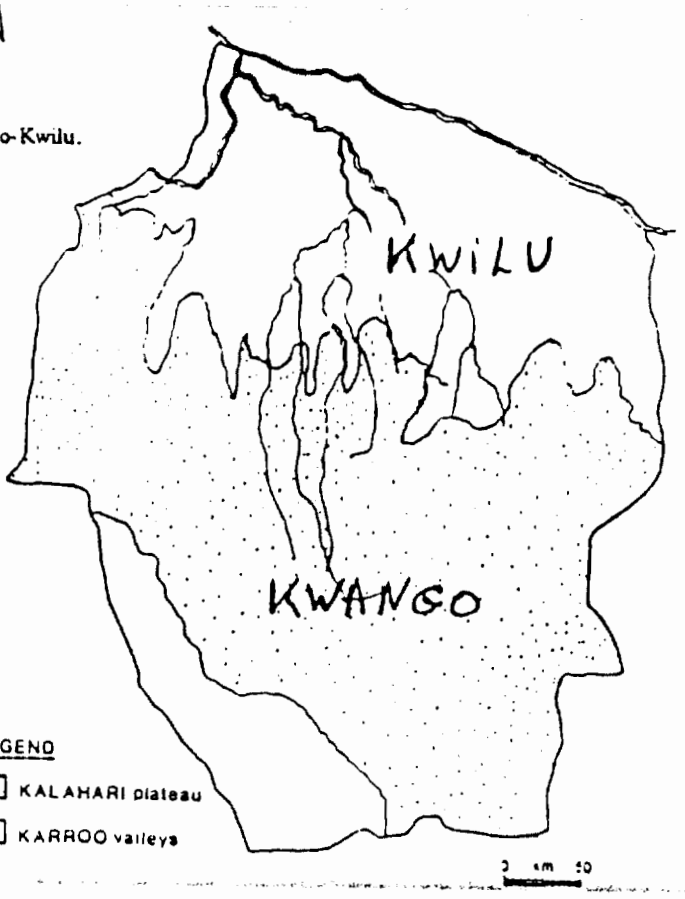
- a station representative of the ecological conditions of large parts of Kwango subregion on the plateau and Kwilu in the valleys
- 4000-5000 ha of land, part of it forest land, part of it savanna
- relative proximity to Kikwit city (62km)

Before the question of a possible upgrading of Kiyaka station is addressed, a historical perspective needs to be brought in and the agro-ecology and dominant farming systems of Kwilu-Kwango need to be explained. In this, reference is made to Louise Fresco's book (op cit.) which should be mandatory reading for anybody studying the agricultural problems of Kwilu-Kwango and the supply of food to the growing Kinshasa market.

Cropping systems in Kwilu-Kwango

There are two basic types of cropping systems based on shifting cultivation in Kwilu-Kwango: the savanna system and the forest system. These parallel the the two agro-ecological zones, the Kalahari plateau so typical of Kwango (and the plateau des BATEKE near Kinshasa) and the Karroo valleys typical of Central and Northern Kwilu.

Map The geomorphology of the Kwango-Kwilu.



In the savanna cropping system, the main association is cassava and voandzou followed by finger millet and squash. Cassava remains in the field after the harvest of the intercrops. In the forest or transition zone, cassava and maize and groundnuts dominate the cropping cycle with patches of other crops along the borders.

The characteristics of these two agro-ecological zones are as follows:

a the Karroo valleys: typically, population densities are over 40/km2. The karroo valleys are relatively more fertile and better served by roads. The 98 and 102 project is squarely within this agro-ecological zone. It is in this zone that the food surplus is being produced. The agricultural potential surpasses by far that of the Kalahari sands. Yields are consistently higher than those in the Kwango. Because of increasing population densities in the Karroo zone, inframarginal land scarcities are emerging and relatively fertile soils with access to urban markets or the tarmac road make it likely that the introduction of modern inputs at acceptable prices, in particular small doses of fertilizer, is but a matter of time (L. FRESCO; p.215). Some parts in the north of Kwilu are relatively uninhabitated notwithstanding its relatively fertile soils because of trypanosomiasis (sleeping sickness).

b the Kalahari table lands. Are made of eolian sands, covering the Karroo, blown over from the Kalahari desert in S. Africa. These soils have less than 5% clay, very low CEC, very permeable with low organic matter content. The pH varies between 4.1 and 5.0. There are U-shaped valleys in these lands and population density is around 10/km2. The table lands are sparsely populated, in contrast to the valleys. Two-thirds of the total area of the Kwango-Kwilu falls in the Kalahari table lands. Chronic food shortages, seasonal famines and malnutrition have been observed as early as 1931 on the table lands and have discouraged settlement in the southern Kwango-Kwilu. Actually, purchasing power in this area is relatively high because of diamond mining. Thus, a lot of food in Kwango is bought from traders from Kwilu.

There is also an intermediate group of collectivities with population densities around 20/km2 that combine both Karroo and Kalahari soils on the border of Kwango-Kwilu.

The INERA station at KIYAKA was established in 1947 and belongs to this intermediate group. The plateaus surrounding KIYAKA are very much KALAHARI table lands. In the valleys, Karroo soils are found. Kiyaka was created to address the problems of persistant famines in Kwango and belongs more to the savanna environment of the Kalahari agro-ecological zone. It is here that the variety F100 was found as part of the INEAC collection. (clone 02864) <u>It can be stated that KIYAKA is not reallyrepresentative of the KARROO agro-ecological zone and the farming systems which have by far the greatest agricultural potential as a surplus food area.</u>

Tabel Estimated production of cassava, Kwango-Kwilu subregion and Bandundu region, 1952-1979 (fresh weight, t/ha)

Year	Kwango	Kwilu	Bandundu
1952	12.7		–
1953	–	–	–
1954	8.5	13.2	–
1955	8.5	13.4	–
1956	8.6	11.0	–
1957	8.5	10.5	–
1958	8.5	10.5	–
1959-1969 not available			
1970	–	–	7.2
1971	–	–	6.9
1972	–	–	6.8
1973	–	–	7.0
1974	–	–	7.2
1975	–	–	7.3
1976	13.2	14.5	7.2
1977	11.8	15.6	7.2
1978	7.9	16.8	–
1979	7.8	14.6	–

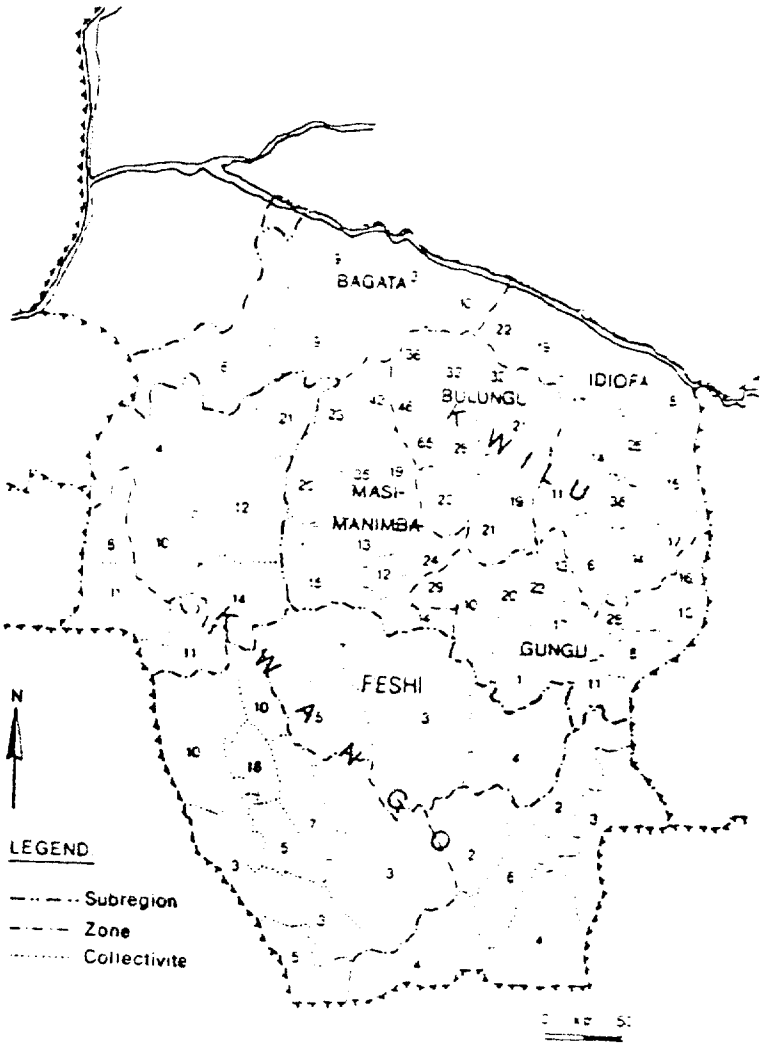
Notes

1 Calculated from:
- Service Provincial de l'Agriculture et de la Colonisation, Province de Leopoldville, for the pre-1960 data.
- Regional Statistical Office, Bandundu, for the data on the Kwango and the Kwilu.
- National Statistical Office, for the regional data (Bandundu).

2 Until 1954, the Kwango-Kwilu was administered jointly as the Kwango.

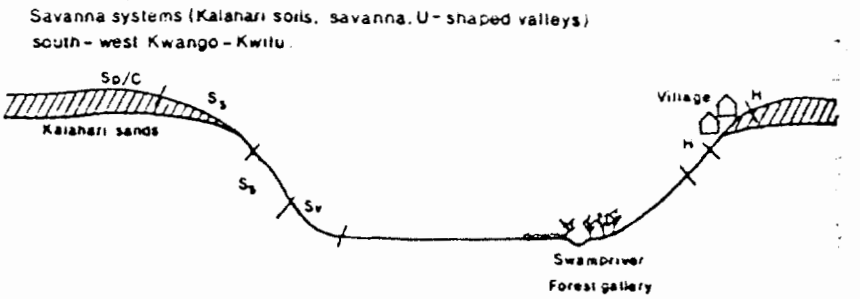
3 – Indicates that data are not available.

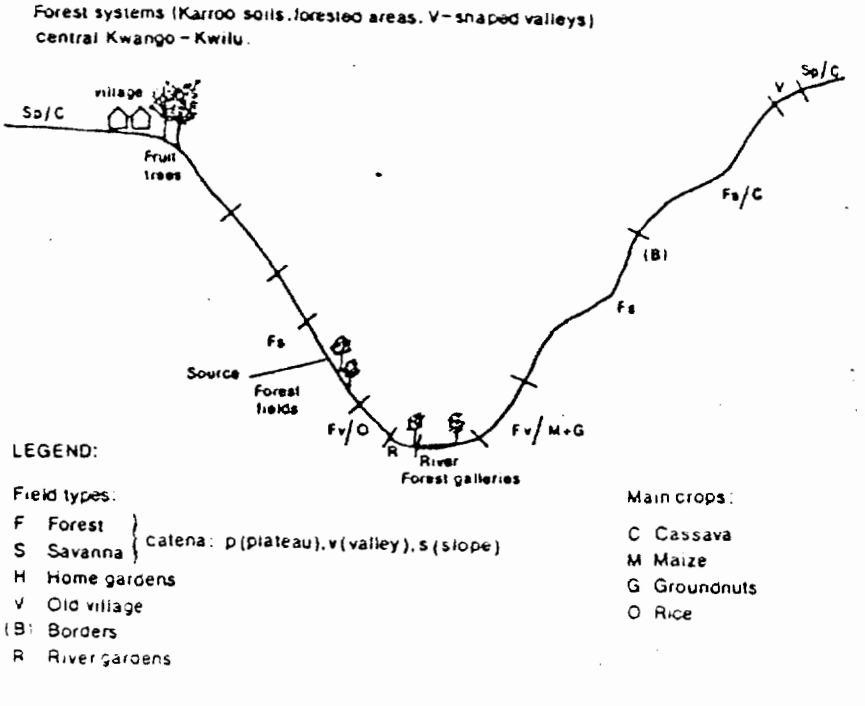
Map Average population density per *collectivité* in the Kwango-Kwilu.



Map The Kwango-Kwilu subregions in Zaire

Figure The location of field types in savanna and forest systems.





A strong case can thus be made for a research station or research facilities (land plus some light buildings) representative of the KARROO i.e. the Kwilu.

In passing, it should be noted that Kiyaka is not suitable as a rice research station in the valleys. The nearest rice is in the Bulungu and Idiofa zones where upland rice has been introduced by projects as a male cash crop on semi-permanent valley bottom fields.

Should Kiyaka then be abandoned for cassava research? This would be an extreme reaction to the foregoing. In as far as cassava research needs to address the problems of the Kwango, Kiyaka is a suitable base. Kiyaka could also be a suitable base for cassava research for the KARROO in the forest valleys typical of the Kwilu. However, enough research sites (with light buildings) and enough on-farm trials should also be located in the Kwilu. But Kiyaka is short of infrastructure, is an isolated station and does not offer attraction to scientists as a decent place to live, bring up children etc.

In this context, reference is made to the excellent report by Edgar J. ARIZA-NINO dated July 30, 1988. The most cost-effective solution to the intractable problems of isolated, self contained research stations which were the hallmark of INEAC and which now absorb much of the donor financing (including the proposed World Bank project on agricultural research) is the establishment of a research base in or near a major city e.g. Kikwit, linked to the national electricity and water grid, with all the amenities of a city which brings with it low overhead costs. This will require a rethinking of the concept of a research station. It will provoke psychological resistance from donors and national authorities as it breaks with the conventional wisdom of what a research station should be. Even IITA, established in 1965, is a completely self contained, independent, neatly fenced American style campus with very large overhead costs.

A concept of a new research base at Kikwit could be a one to two acre plot with the following infrastructure:

- offices
- laboratories
- storerooms
- a small garage
- greenhouses, screenhouses as required
- a small plot for germplasm collection, breeding etc.

All staff and personnel would live in the city and services provided by the city would be used in as far as they are cost-effective.

In each major agro-ecological zone, ie. in the KARROO and in the KALAHARI, there would be a research site (10-20 ha) with a small office, storeroom and shelter for the guards. Kiyaka could serve as the site for the Kalahari. Another site would have to be chosen for the Karroo, probably in the center of the 098-102 project area, e.g. near Bulungu. Such an arrangement would also induce the FSR-scientists to move around, carry out exploratory surveys, do constraints analyses, conduct on-farm trials etc.

ANNEX 12

PNM AND THE PLANNED MOVE TO THE KANIAMESHI FARM

PNM started in 1971 in Kisanga, with technical assistance from CIMMYT, and financed by the GOZ. From 1975 on, USAID financed the foreign exchange component of the project. CIMMYT left in 1981 and was replaced by IITA in the RAV project from 1985 on. As explained elsewhere in this report, maize research in Zaire since 1972 can be considered successful. A stream of new, productive varieties, well adapted to Zairean ecological conditions and farming systems have been developed, released and extended. They are being used extensively in all major agricultural development projects which include a maize production component, such as PCS, PNS, PMKO, Project Hinterland Minier etc. Most of the major varieties are being converted to include streak virus resistance which is a major constraint (estimated reduction in yields of 25%) on maize production in Zaire, especially when planting late. IITA/s work in developing and incorporating streak virus resistance in maize varieties in Africa is probably one of its greatest achievements which won the King Boudouin award of the CGIAR.

PNM/s work started in the INERA station of Kisanga near Lubumbashi. This worked satisfactorily till 1982 when it was announced by the Presidency of Zaire that a presidential farm, analogous to the presidental farm at Nsele near Kinshasa, would be established at the Kisanga research station. Its main purpose was to produce maize for animal feed, chickens (eggs and broilers), pigs and fish. With this decision, the Kisanga station ended to be an INERA research station. However, PNM could continue work at the station as they could retain some land (about 3 hectares) and certain buildings, laboratory and office space. At the same time, the KANIAMESHI farm which is held by GECAMINES - DEVELOPPEMENT (EX - CEPSE), a development subsidiary of the state - owned copper mining company in Shaba, was leased on a rent free basis to PNM on October 28, 1983.

The project data sheet of the RAV project (number 660-0091) contains in annex M-1 a summary description by P.V. HARTLEY, IITA farm management engineer of the various soils which are available at the farm. In annex M-3, the physical plant review by John G. H. CRAIG of IITA, an inventory is given of the physical plant at Kaniameshi, a conversion of buildings is suggested and a rough estimate is made of the cost of rehabilitation/conversion, including rewiring, electic power connection to Kipushi town, plumbing and water supply. The estimated cost is $845,000 which is probably conservative. In 1985, CADIC, a Kinshasa based private firm, completed an in depth study of conversion/rehabilitation of Kaniameshi and an investment budget was drawn up amounting to 104 million Z in Novermber 1986 (about one million US$). However, USAID declined to release investment funds for Kaniameshi until RAV/PNM acquires the cadastral title to the farm. Until now, this

title has not been obtained and the physical plant at Kaniameshi is in the same state it was in 1983 except that in the meantime all fittings, furniture and equipment has disappeared.

In 1987, President Mobutu publicly announced to turn over the management of the presidential farms (DAIPN) to the national labor union (UNTZA). This, however, did not adversely affect PNM's research at Kisanga.

In August 1988, RAV received notice from GECAMINES - DEVELOPPEMENT to completely retire from the Kisanga station. After President Mobutu's visit to YUGOSLAVIA in 1988, it was decided (cfr annex 13) to create a "Centre de Recherches sur le Mais" (CRM) with a mandate to create hybrid maize varieties, to carry out seed production and extension and any other activities which increase and stabilize maize yields, with technical assistance from Yugoslavia. The national organisation in charge of CRM is Gecamines - Developpement.

Although Gecamines - developpement has no formal authority at the DAIPN/UNTZA farm at Kisanga, apparently, PNM has to leave Kisanga at short notice with the approval of DAIPN/UNTZA. The laboratory and offices have alreay been evacuated by PNM, but work still goes on at Kisanga, in extremely tight spatial conditions, pending a decision to move to offices in Lubumbashi town. The director of PNM already has an office at Kaniameshi.

Present infrastructure at Kaniameshi is very poor, since it is an abandoned farm with no electricity and no running water in the buildings. A major rehabilitation/conversion needs to take place before a move to the farm can be considered. Moreover, the mission is not convinced that rehabilitation/conversion of old farm buildings is the most cost-effective-long term solutin for PNM/s infrastructure requirements. New construction of functional facilities for PNM could be preferable if it is decided to stay at Kaniameshi.

There is one major additional constraint of the Kaniameshi site which needs to be investigated. Bordering the farm, there is the Kaniameshi river and a watershed which is being used by Gecamines - Kipushi as a dumping site for sludge and effluents from the Kipushi copper pelletizing factory. A new, major earthen dam is under construction opposite the farm to increase the holding capacity of the lake such that more sludge can be dumped. It is to be expected that the sludge contains toxic waste such as heavy metals (cadmium, a byproduct of copper production) etc. This could possibly contaminate the water table at the Kaniameshi farm and pose a major long term threat to the viability of the farm as a research site.

There are also some questions about the soils available at Kaniameshi. At least one expert (Albert FEITKNECHT, Central Shaba evaluation team) expressed his reservations about the suitability of the soils for a research station representative of Shaba.

RECOMMENDATIONS:

1. USAID should contract a hydrologist/toxic waste expert to investigate the possibility of seepage and contamination of the Kamameshi water table and soils with toxic substances before major infrastructural investments take place at the farm.

2. A detailed soil survey should be done of the Kaniameshi farm in order to determine its suitability for a maize research station for Shaba region.

3. USAID should contract an architect/civil engineer to analyze the long term costs-benefits of the following options:
a. conversion/rehabilitation of the existing buildings at Kaniameshi
b. new construction of a functional research station at Kaniameshi.
c. the establishment of a research base at or near Lubumbashi whereby the Kaniameshi farm serves as experimental site. This would only require minimal conversion/rehabilitation of buildings. Kisanga serves this purpose.
d. other possibilities. The whole question of where research stations should be located needs to b e re-examined (cfr, section on sustainability).

4. The World Bank is planning to finance a national agricultural research project in Zaire, including the drawing up of a master plan and the rehabilitation of seven INERA research stations. The World Bank should consider infrastructural investment in the Kaniameshi farm in light of the importance of maize research in Zaire.

THE QUESTION OF THE PROPERTY TITLE TO THE KANIAMESHI FARM

In 1952, Mr. LAHAYE, a Belgian private farmer, established a cattle, poultry and pig farm near Kipushi. The total size of the farm is about 200 hectares. As was usual in the colonial days, European farmers or agro-industrial firms could easily obtain a land concessin, valid for 99 years. This is probably what Mr. Lahaye acquired.

In 1974, all foreign held enterprises in Zaire were nationalized (Zaireanisation) and the Kaniameshi farm was attributed to the DOA which gave it to Gecamines - exploitation. An ordonnance - loi (law) was published in 1976 which listed Gecamines - exploitation as the owner of the farm. Apparently, Gecamines never received an

official title to the farm but Mr. Lahaye seems to have been compensated by the GOZ or Gecamines for the expropriation. Mr Lahaye's son is now employed at Gecamines.

In 1982, a letter of the governor of Shaba region indicated that PNM would be able to lease the Kaniameshi farm indefinitely, without rent. PNM undertook steps to obtain the formal title and wrote to Gecamines, the governor, the DOA and RAV - coordination. A letter from Gecamines - exploitation dated September 2, 1988 stated that PNM could obtain the farm, without payment. However, the cadastral office at Lubumbashi was unable to secure a title for PNM. First of all, Gecamines never officially obtained a title; they have only a 1976 ordonnance - loi as proof of ownership. Secondly, the cadastral office lost the original file and title of Mr. Lahaye.

In 1985, PNM financed Regideso, the national water supply company, for connection to the water mains. Water is now available at the Kaniameshi farm. On November 7, 1988, PNM and RAV did a /remise - reprise/ with Gecamines. This indicates that Gecamines has turned over control of the Kaniameshi farm to PNM/RAV. With this act, PNM is confident that they can obtain a cadastral title to the farm soon.

In the meantime, PNM is planning to temporarily occupy in Lubumbashi a property including office space, storage rooms and a garage. Negotiations are underway with USAID to rent such a facility and a concrete proposal has already been made. USAID has agreed to pay the rent for such a facility.

Suggestion

If a cadastral title cannot be obtained soon in Lubumbashi, the DOA/RAV need to approach the cabinet of the Department des Affaires Foncieres and/or the Department du Portefeuille in Kinshasa to secure a title to the Kaniameshi farm. However, a new plan (land survey) of the farm will first have to be drawn up indicating its precise location, size, dimensions etc.

ANNEX 13

THE CENTRE DE RECHERCHES SUR LE MAIS (CRM)

OF GECAMINES - DEVELOPPEMENT

Two members of the evaluation team visited Gecamines Developpement on November 25, 1988 and had a discussion with Prof. Dr. Ir. BOTULA MANYALA MA BOPOTO L.L., delegue general adjoint, former director general of INERA, former researcher of CREN-K, and driving force behind CRM.

CRM was created by ordonnance - prèsidentielle Nr. 88-093 of July 8, 1988 (attached to this annex). Dr. Botula studied in Yugoslavia and obtained his doctorate there in the field of plant genetics, and particularly hybrid maize.

Dr. Botula insisted that CRM did not overlap with PNM as PNM has never produced hybrids. He sees it as a division of labor and CRM intends to collaborate with PNM, a.o. obtain inbred lines from PNM. The Maize Institute of Yugoslavia will provide technical assistance to CRM. However, it appears that Gecamines or the GOZ will have to pay for the technical assistance, including the foreign exchange cost. It is intended that CRM becomes self-supporting after an initial "pump-priming" from the GOZ.

We were told that Zaire imports about 800 t annually of hybrid maize seed, principally SR52 from Zimbabwe. Gecamines said that they obtained yields of 8t/ha. Other sources indicated a yield of only 2.5t/ha.

Rumors have it that the management of Gecamines recently turned down request CRM's for funds, including foreign exchange. It thus appears that no funding is forthcoming for CRM. If this is the case, CRM will disappear from the scene as fast as it appeared.

In August - September 1988, the GOZ provided the governor of Shaba region with $500,000 to acquire hybrid maize seed for large maize farms and interested maize growers. Apparently, these funds came from the DOA. The seed was acquired and sold in Shaba. The counterpart funds (CF) thus generated are now being sollicited by CRM to start its operations. However, this cannot happen without the approval of the Regional Assembly ie. the regional parliament. CRM is thus actively seeking funds outside Gecamines. They will probably not succeed in this and CRM might never get off the ground.

Dr. Botula indicated that he wants to establish contact with maize researchers in Zaire and that a convention with PNM would be desirable for collaboration. He also hopes that USAID will contribute equipment and training funds to CRM. Finally, he mentioned that it is not the intention of the GOZ and its President

to abolish PNM by the creation of CRM outside RAV. It is, however, significant that the creation of CRM was the direct cause for the eviction of PNM from Kisanga.

UNDERMINING OF PNM'S SUSTAINABILITY

The creation of the Centre de Recherches sur le Mais (CRM) at Gecamines Developpement and its location at the DAIPN/UNTZA Kisanga farm may seriously threaten PNM's long term sustainability. Not only does the creation ensure the eviction of PNM from Kisanga, it also overlaps with the research mandate of PNM, causes a diversion of scarce GOZ resources and infringes upon the potentially most profitable section of PNM's activities.

It is generally believed that hybrid maize seed production is a preprequisite for survival of private seed companies in Sub-Saharan Africa. Such private seed companies which engage in research on hybrid maize varieties exist already in Zimbabwe (ie. source of SR52 hybrid maize), Kenya (Kenya Seed Company) and Nigeria (Pioneer Company, Gen. OBASANJO Seed Company).

Pfizer/Dekalb is considering setting up a hybrid maize seed company in S.S. Africa, either Nigeria or Ivory Coast (source: Dr. Pol Christensen, Dekalb). A 1986 CIMMYT report on maize seed production states that hybrid maize varieties must outyield open pollinated varieties by 30% in order to make private seed production economically sustainable. Since the early 1980's, IITA has been actively conducting research on hybrid maize. Inbred lines are available and are being tested in the NARS, particularly in Nigeria, Cameroon, Ghana and Zaire (PNM).

Dr. Efron, former director of IITA's maize improvement program, estimated in 1987 that superior hybrid maize varieties from IITA and NARS would be on the market in S.S. Africa from 1990 on (personal communication at the occasion of the CGIAR - task force study on maize and cassava research needs in S.S.Africa). Several private companies and large maize farms in Shaba but also in Cameroon (Maiscam), Gabon (SIAEB at Boumango) and Nigeria are importing hybrid maize seed (SR52 and other varieties) from Zimbabwe.

In 1988, the offices of the governor of Shaba region imported about 800 tons of hybrid maize seed from Zimbabwe. Thus, the development of superior hybrid maize varieties by PNM with the support of IITA and hybrid maize seed production, either directly or via seed companies (with the payment of royalties) could in the future enhance the financial sustainability of PNM. The creation of CRM outside PNM with the explicit mandate of hybrid maize development, with technical assistance from Yugoslavia and potential financial support from GOZ and Gecamines seriously undermines financial sustainability of PNM.

RECOMMENDATIONS:

1. USAID should express its concerns to the GOZ regarding the creation of the /Centre de Recherches sur le Mais/ outside RAV/PNM and the eviction of PNM from Kisanga.

2. IITA should refrain from making available inbred lines of maize to CRM with a view to developing hybrid maize varieties since such an action conflicts with the objectives expressed in its medium term plan 1988-1992 regarding international cooperation: strengthening of NARS and enhancing their sustainability. CRM is created outside the NARS of Zaire, diverts scarce resources from it and threatens its long term financial sustainability.

ORDONNANCE N° 88- 093 DU 8 juillet 1988 PORTANT CREATION D'UN CENTRE DE RECHERCHE SUR LE MAIS.

LE PRESIDENT-FONDATEUR DU MOUVEMENT POPULAIRE DE LA REVOLUTION, PRESIDENT DE LA REPUBLIQUE,

Vu la Constitution, spécialement son article 45 ;

Vu, telle que modifiée à ce jour, l'Ordonnance n° 84-224 du 2 novembre 1984 portant création et statuts de la GENERALE DES CARRIERES ET DES MINES POUR LE DEVELOPPEMENT, en abrégé "GECAMINES DEVELOPPEMENT" ;

O R D O N N E :

Article 1er. - Il est créé au sein de la GENERALE DES CARRIERES ET DES MINES POUR LE DEVELOPPEMENT, en abrégé "GECAMINES DEVELOPPEMENT", un centre de recherche sur le maïs.

Article 2. - Le Centre de recherche sur le maïs a pour objet toutes recherches sur le maïs en vue d'obtenir des rende élevés et stables, dans diverses conditions agroécologiques, et l commercialisation des fruits de ses recherches.

Le Centre est chargé notamment :

- de la création des hybrides de maïs à rendement élevé ;
- de la production, du conditionnement et du stockage des semence de base et de leur commercialisation ;
- des études et de la vulgarisation des techniques culturales du maïs.

Il peut en outre entreprendre toutes opérations généraleme quelconques se rattachant directement ou indirectement à son obj

../..

Article 3. - Le Centre transmettra régulièrement au Département de l'Agriculture et du Développement Rural les fruits de toutes ses recherches ainsi que tous autres rapports susceptibles de contribuer à l'amélioration de la production du maïs au Zaïre.

Article 4. - La présente Ordonnance entre en vigueur à la date de sa signature.

Fait à GBADOLITE, le 8 juillet 1983

MOBUTU SESE SEKO KUKU NGBENDU WA ZA BANGA,

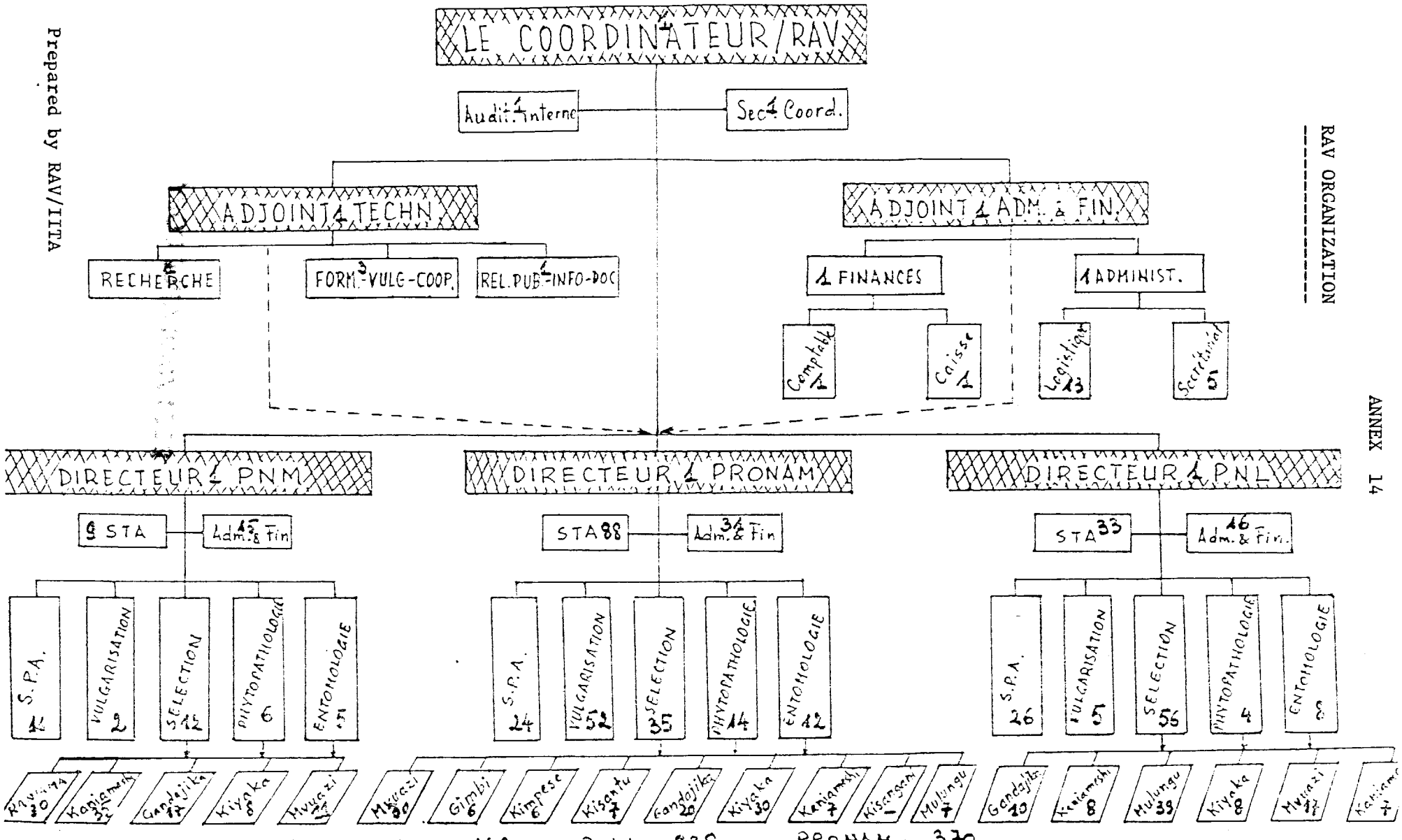
Maréchal.

REPUBLIQUE DU ZAIRE
M.P.R.
JUSTICE PAIX TRAVAIL
Par le Peuple Zaïrois

COPIE CERTIFIEE CONFORME
A L'ORIGINAL
15.08.83

ANNEX 14

RAV ORGANIZATION



N.B. COORDINATION = 32 P.N.M. = 162 P.N.L = 238 PRONAM = 370

SOIT UN EFFECTIF TOTAL DE : 802 AGENTS

Prepared by RAV/IITA

ANNEX 15

5 December, 1988

PROJECT 091
LOCAL CURRENCY RESOURCES AVAILABLE
OPERATING COSTS ONLY

AID	COORDINATION	PRONAM	PNM	PNL	TOTAL
1984	19,500,000	13,400,000	-	-	32,900,000
1985	17,701,848	35,589,088	18,309,064	4,400,000	76,000,000
1986	31,467,000	31,741,150	29,034,999	27,723,000	119,966,149
1987	43,218,720	61,226,520	36,015,600	39,617,160	180,078,000
1988	65,500,000	72,000,000	45,000,000	45,000,000	225,000,000
Subtotal	118,387,568	213,956,758	128,359,663	116,740,160	633,944,149
GOZ					
1984	-	3,726,000	2,500,000	-	6,226,000
1985	-	1,363,000	-	-	1,363,000
1986	-	1,250,000	1,000,000	-	2,250,000
1987	814,845	500,000	-	-	1,314,845
1988	-	-	-	-	-
Subtotal	814,845	6,839,000	3,500,000	-	11,153,845
Grand Total	119,202,413	220,795,758	131,859,663	116,740,160	645,097,994

TOTAL LOCAL CURRENCY RESOURCE UTILIZATION

Loc. Cur.	1984	1985	1986	1987	1988
Op.AID/CPF	32,900,000	76,000,000	119,966,149	180,078,000	225,000,000
Op.GOZ	6,226,000	1,363,000	2,250,000	1,314,845	-
Subtotal	39,126,000	77,363,000	122,216,149	181,392,845	225,000,000
Cap.- AID	45,600,000	-	-	8,000,000	30,000,000
Cap.- GOZ	-	-	-	2,988,000	7,500,000
Subtotal	45,600,000	-	-	10,988,845	37,500,000
Grand Total	84,726,000	77,363,000	122,216,149	192,380,845	262,500,000

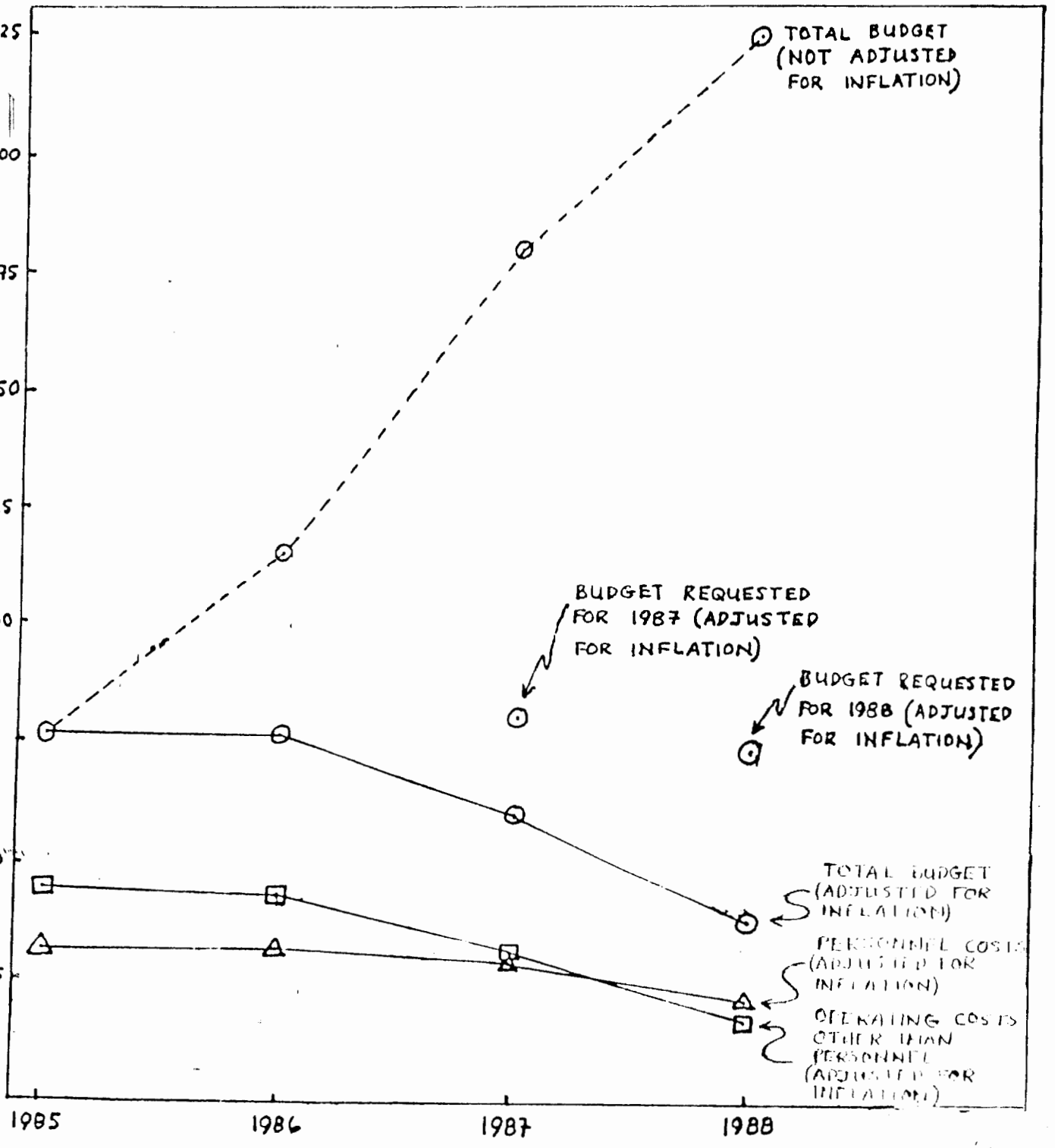
TABLEAU RECAPITULATIF [illegible] LIGNES [illegible] AU RAV (all sources)

ANNEE	PROVENANCE DES FONDS	COORDINATION	PRONAM	P N M	P N I	TOTAL
1984	Solde au début 1984	-	1.649.130	-	-	1.649.13
	B.O. (60Z) 1984	-	3.726.000	2.500.000	-	6.226
	F.C.P. 1984	19.500.000	13.400.000	-	-	32.900.00
	B.I. (USAID)	-	45.600.000	-	-	45.600.00
	Fonds reçus en 1984					86.375.13
1985	B.O. 1985	-	1.363.000	-	-	1.363.00
	F.C.P. 1985	17.701.848	35.589.088	18.309.064	4.400.000	76.000.00
	Fonds reçus en 1985					77.363.00
1986	F.C.P. 68 transférés	31.467.000	31.741.150	29034099,48	27.723.000	119.966.14
	Reliquats non transférés	2.365.272	-	-	-	2.363.27
	Dettes remises	-	1.668.579	-	-	1.668.57
	B.O. 1986	-	1.250.000	1.000.000	-	2.250.00
	Fonds reçus en 1986					126.250.00
1987	F.C.P. 87 transférés	43.218.720	61.226.520	36.015.600	39.617.160	180.078.00
	B.O. 1987	1.800.000	2.550.000	1.500.000	1.650.000	7.500.00
	KIYAKA	-	8.000.000	-	-	8.000.00
	Fonds agricole (60Z)	-	500.000	-	-	500.00
	[illegible] Budget 86 reliquat pour 1987	* 814.845	**2.988.000	-	-	-
		45.833.865	75.264.520	37.515.600	41.267.160	196.078
		* Revue scientifique **Prêt au PRONAM + Réhabilitation HIP à Mvuazi				
1988	FCP 88 transférés	63.000.000	72.000.000	45.000.000	45.000.000	225.000.00
	Fonds spécial achat pneus	-	-	-	-	2.500.00
	Construction Gandajika	-	-	-	-	30.000.00
	B.I. (60Z) 1988	875.000	2.225.000	2.150.000	2.250.000	7.500.00
	Au 08/11/88	63.875.000	74.225.000	47.150.000	47.250.000	
						265.000.00

N.B.: Un fonds spécial de 10.000.000 Z a déjà été libéré par l'USAID pour l'achat des pièces de rechange, mais n'est pas encore crédité à notre compte.

ANNEX 16

GRAPH IMPACT OF INFLATION IN COUNTERPART FUNDS MADE AVAILABLE TO PROJECT 091



NTERPART FUND SITUATION, 1985 TO 1988, PROJECT 091

E: INFLATION ADJUSTMENT EXPRESSES BUDGETS IN TERMS OF 1985 ZAIRES

RATE OF INFLATION:

1986 = 51%

1987 = 100%

1988 = 100% (PREDICTED)

Prepared by RAV/IITA

ANNEX 17

TABULATION OF VISITS TO NATIONAL PROGRAMS BY USAID PERSONNEL IN 1988

DATE	PROJECT OFFICER	SITE VISITED
January	J. Mitchell and M. Jacob	M'vuazi and Kisantu
February	J. Mitchell and M. Jacob	Lubumbashi
March	M. Jacob	Kiyaka
May	J. Mitchell	Lubumbashi
June	M. Jacob	M'vuazi
June	M. Jacob	Mulungu
July	J. Mitchell	M'vuazi and Kisantu
August	M. Jacob	Lubumbashi
December	J. Coles, L. Brown, R. Harvey and J. Goodwin	M'vuazi
December	D. Brown and R. Harvey	Kiyaka

I I T A S T A F F - R A V

NAME	POSITION	LOCATION	ARRIVAL DATE
BROCKMAN, Frank	Chief of Party	KINSHASA	4 / 82
SEYE, Masseye	Administrative Officer	KINSHASA	6 / 88
OSINAME, Olu	Agronomist, Principal Advisor, PRONAM	M'VUAZI	3 / 86
BARTLETT, Chris	Economist, PRONAM	M'VUAZI	3 / 86
FLORINI, Diane	Regional Extension Specialist, PRONAM	M'VUAZI	5 / 88
BUYYALA, Chitti Babu	Farm Manager / Civil Engineering Services Officer	M'VUAZI	10 / 84
GARCIA, Paco	Mechanical Engineering Services Officer	M'VUAZI	9 / 86
JOHNSON, Ken	Maize breeder, Principal Advisor, P . N . M .	LUBUMBASHI	11 / 85
BERHE, Tareke	Agronomist, P . N . M .	LUBUMBASHI	8 / 87
VOGEL, Wolfgang	Economist, P . N . M .	LUBUMBASHI	9 / 86
HENNESSEY, Ron	Entomologist	LUBUMBASHI	3 / 81
CAMACHO, Luis	Grain Legume Breeder, Principal Advisor, P . N . L .	GANDAJIKA	10 / 86
SHANNON, Dennis	Agronomist, P.. N . L .	GANDAJIKA	6 / 85

ANNEX 19

memorandum

DATE: June 28, 1988

REPLY TO ATTN OF: John H. Bierke, Program Officer

SUBJECT: Counterpart Fund/Prime Schedule

TO: Project Officers and Project Directors

1. It is a pleasure to announce that a significant increase in salary ceilings has been authorized effective July 1, 1988. Implementation of the salary increases is subject to the guidance contained in this memorandum.

2. The budgetary approval and implementation process this year has been slow and in some cases painful, and I would like to review with you some of the underlying reasons. During CY 1985, it became abundantly clear that project expectations (Budget Requests) were far in excess of projected counterpart fund availabilities and that individual projects had set budgetary policies which varied widely. In October 1985, the Program Office issued the first guidelines on primes. However, the budgetary process proved difficult to control and during the first half of CY 1986, there were insufficient funds. As a result project implementation suffered dramatically. In October 1986, as part of the CY 1987 Budget Process, Directive 306 was issued in an attempt to establish a uniform policy with respect to Primes and Salary Ceilings (four project implementation units were temporarily exempted from the Policy). During CY 1987, budgetary implementation proceeded in a much smoother manner although funding availabilities continued to be below budgetary requests. However, during 1987, the Congress of the United States and AID/Washington began to focus on the use of Counterpart Funds (CPF) and policy guidance was issued to overseas missions on June 6, 1987. This Policy Guidance delineated under what conditions and for what CPF may be used. In late 1987 and early 1988, a U.S. Government Audit Team from the Regional Inspector General for Audit, Dakar Office, conducted an audit of salary supplements in Zaire, and their final report was issued June 1, 1988 (Audit Report No. 7-660-88-12). This Audit Report listed I.G. findings and made a number of recommendations with which USAID/Zaire must now comply.

3. Of particular interest to all project personnel is what has happened to salary ceilings and primes as we have gone through this adjustment period. Because CPF have been insufficient to meet project expectations (Budget Requests), it has been impossible to maintain the purchasing power of primes and salaries paid from the CPF. Inflation has cut purchasing power of salaries drastically. The July 1, 1988 prime and salary ceiling adjustment should provide considerable relief to most project personnel. However, if we are to maintain purchasing power, the projects themselves must make every effort to effectively utilize CPF to insure that project objectives are

OPTIONAL FORM NO. 10
(REV. 1-80)
GSA FPMR (41 CFR) 101-11.6
5010-114

☆ GPO : 1985 O - 461-275 (364)

achieved at minimum cost. Of particular concern is insuring that project staffs are no larger than absolutely necessary to implement the projects and that operating expenses, such as the cost of vehicle operations, are tightly controlled. All project personnel are requested to closely scrutinize costs and take actions necessary to bring CPF expenditures into line with project outputs.

4. Project personnel should also take note of the fact that a new policy has been approved with respect to personnel who are receiving free housing as part of their compensation package. This new housing policy will be implemented effective July 1, 1988. This policy applies only to those few individuals who have been receiving free housing above and beyond the salary ceiling. It does not apply to those projects which break compensation down into individual allowances (housing, transportation, etc.) within the maximum salary ceiling. (See attached revised prime policy)

5. All projects are requested to submit as soon as possible: (1) revised budgets, detailing any additional funding requirements needed to implement the July 1, 1988 revised prime policy and the instructions contained in this memorandum; (2) comprehensive listings of employees, showing for each employee the designated pay grade (projects using grade structures different from the GOZ's should indicate the equivalent GOZ grade), source of base salary (CPF or B.O.), proposed monthly premium, and supplementary benefits provided (transportation, housing, furnishings, and other). The total of all benefits (excluding the educational prime) must be equal to or less than the authorized salary ceiling. In addition, please provide a list of levels of employee educational attainment and resultant educational primes.

6. The revised prime policy is effective July 1, 1988, however, implementaion of the policy by individual projects is subject to the following requirements:

660-0080, Fish Culture Expansion - The project is authorized to implement the revised prime policy. However, the project terminates September 15, 1988 and no funding will be provided after that date under Project 660-0080. All funds remaining in the Project CPF as of September 15, 1988 will be returned to the Department of Plan. The project should terminate all project personnel receiving base salary from the counterpart fund (estimated at 129 employees) effective September 15, 1988 and pay them prior to project termination. All primes and allowances paid to personnel receiving base salary from the Budget Ordinaire (estimated at 44 employees) will also stop as of September 15, 1988. The project should proceed to insure that all project liabilities are paid prior to September 15, 1988. If additional funding is required to liquidate project liabilities a revised detailed budget should be submitted ASAP.

With respect to any continuing PPF support of the Peace Corps after September 15, 1988, funding would be provided from the Small Project Support Project (SPSP) (660-0125). PPF should prepare a proposal for a Peace Corps Support Contract under 660-0125, for submittal and discussion with the SPSP design team. PPF should develop its proposal in full recognition of the fact that 660-0080 which was a large project effort terminates September 15, 1988 and what is required and anticipated under 660-0125 is a small efficient Peace Corps Support effort. For further guidance see project 660-0125.

660-0091, Applied Agricultural Research - The project is not authorized to implement the revised prime policy at this time. A review of staffing required to implement the project will be carried out and a minimum of 240 employees will be terminated prior to September 30, 1988. All employees terminated prior to September 30, 1988 will have their severance pay calculated and paid based upon the July 1, 1988 prime policy. If a minimum of 240 employees are off the payroll by September 30, 1988, all remaining employees will receive retroactive pay, from July 1, 1988, based upon the July 1, 1988 prime schedule. If the reduction in force has not taken place by September 30, 1988, the January 1, 1988 prime schedule will be kept in force for the balance of CY 1988. No additional hiring, with the exception of returned participants, is authorized without the written concurrence of the USAID Project Officer. Additionally, it should be noted that I.G. Audit Report No. 7-660-88-12 identified 44 employees who received compensation during 1987 in excess of that authorized under the Prime Policy. Compensation levels must be reviewed and all excess salary payments deducted from the increase authorized in the revised prime policy prior to paying employees at the revised July 1, 1988 rate.

660-0102, Area Food and Market Development - The project may proceed with implementation of the revised prime policy. However, I.G. Audit Report No. 7-660-088-12 identified six employees who were compensated in 1987 in excess of that authorized by the Prime Policy. These excess payment will be deducted from salary increases authorized by the revised prime policy.

660-0119, Agriculture Policy and Planning - A review of personnel receiving primes or salaries from the CPF must be conducted to determine who specifically is contributing to project objectives. Personnel not working on the project should not receive compensation under the CPF. Specifically personnel who were authorized primes or salaries under Project 660-0070, Agricultural Sector Studies, should be removed from the payroll immediately (Prior to July 31, 1988). The 660-0119 CPF may be used to pay any necessary termination costs. A serious review of personnel requirements should be conducted and a plan for reducing the payroll will be presented for review no later than September 30, 1988. As soon as the personnel reduction plan has been approved the project may proceed with the implementation of the revised prime policy (salary payments will be retroactive to July 1, 1988). Nonessential personnel will be off the payroll prior to December 31, 1988. The CY 1989 CPF budget will not be approved at the current level of personnel.

660-0105, Central Shaba Development:

Budget #1 Agricultural Development - the project may proceed with implementation of the revised prime policy.

Budget #2 SHADO Office - all current salaries that exceed the levels authorized under the July 1, 1988 revised prime policy are hereby frozen, no further increases will be authorized. Salary increases in the future will only be authorized in accordance with the prime policy.

Budget #3 Roads - No primes or salaries are authorized. However, with respect to those project employees who received housing in kind, but do not receive CPF primes or salaries, the policy implications should be reviewed, and recommendations should be submitted recommending appropriate modifications to the Prime Policy.

660-0026, Agricultural Market Development I - No primes or salaries are authorized. The project should review the policy implications of housing provided in kind to project employees who are not authorized CPF primes or salaries and make recommendations for Prime Policy modifications.

660-0028, Agricultural Market Development II - No primes or salaries are authorized. The project should review the policy implication of housing provided in kind to project employees who are not authorized CPF primes or salaries and make recommendations for Prime Policy modifications. The project, however, terminates on September 30, 1988 and the project should liquidate all outstanding liabilities prior to that date and return any CPF balances to the Department of Plan.

660-0098, Agricultural Market Development III:

Budget #1 - Transport Development - All current salaries that exceed the levels authorized under the revised July 1, 1988 prime policy are hereby frozen. Salary increases in the future will only be authorized in accordance with the Prime Policy. All contractors and grantees under the project should be informed that the GOZ/USAID will not pay salaries above current levels unless they are in conformance with the Prime Policy. With respect to project employees who are provided housing in kind, but are not authorized CPF primes or salaries, the project should review the policy implications and make recommendations for appropriate modifications in the Prime Policy.

Budget #2 - BSU - All current salaries that exceed levels authorized under the July 1, 1988 revised prime policy are hereby frozen, no further increases will be authorized which are not in accordance with the Prime Policy. CY 1989 personnel requirements should be reviewed in developing the CY 1989 budget. BSU personnel requirements will be reviewed as part of the CY 1989 budget approval process.

660-0115, Shaba Refugee Roads - No primes or salaries are authorized. The project should review the policy implications of housing provided in kind to project employees who are not authorized CPF primes or salaries and make recommendations for Prime Policy modifications.

660-0113, Private Management Support (Technoserve) - The Grantee should be informed immediately that their salaries have been frozen at their current level. The GOZ/USAID will no longer pay for salary increases which are not in conformance with the Prime Policy. Technoserve should proceed to pay all outstanding Project 660-0113 obligations prior to project termination on 9/30/1988. Any remaining CPF as of 9/30/1988 should be returned to the Department of Plan. For further guidance see project 660-0125.

660-0125, Small Project Support Project - The PP design team in developing the project will be instructed that all compensation under the project will be in conformance with the Prime Policy. With respect to the possible need for interim support to Technoserve and PPF/Peace Corps, the Project Officer is instructed to develop CY 1988 CPF budgets as follows:

Budget #1 - Technoserve - An interim budget (9/30/88 - 12/31/88) will be developed which will ensure that Technoserve operations continue smoothly during the period in which they are negotiating with the SPSP for future support. In developing the budget all sources of Technoserve financing need to be reviewed, the budget should not be overly restrictive but it should not provide funding for the expansion of Technoserve operations.

Budget #2 - PPF - An interim budget (9/15/88 - 12/31/88) will be developed which will ensure that PPF is able to provide adequate support to the Peace Corps during the period that the Fish Culture follow on activity is being developed. A new bank account should be opened and funds deposited prior to 9/15/88. The account will require two signatures on checks a PPF and a SPSP signature. In developing the budget a maximum of forty (40) employees should be identified by name for short-term contracts to provide Peace Corps support. In identifying people emphasis should be placed upon field support personnel, not Kinshasa based personnel. PPF should provide training, logistical and farmer visit support. The possibility for limited support to Mobile Teams (Post Peace Corps Farmer Support) should also be considered. In developing the budget all equipment including vehicles and facilities required for Peace Corps support should be specifically identified. All operating costs included in the budget should be specifically tied to the people, equipment and facilities required to provide support to Peace Corps. As part of the budget exercise the services to be provided should specified. CPF costs should be directly tied to the desired support services.

698-0433, AMDP Training - No long term personnel are authorized under the project.

660-0094, Family Planning Services - The Project is authorized to implement the new Prime Policy. However I.G. Audit report No. 7-660-88-12 identified one individual who in 1987 received a significant amount in excess of that allowed under the Prime Policy. Excess payments will be deducted from increases authorized under the revised prime policy.

660-0101, School of Public Health - Implementation of July 1, 1988 revised prime policy is not authorized until a list of all previous excess salary/prime payments by individual has been compiled and a pay back schedule established. (It should be noted that I.G. Audit No. 7-660-88-12 identified 13 individuals who received excess payments during 1987). These excess payments will be deducted from the increases authorized under the July 1, 1988 revised Prime Policy. Only after the pay back schedule been established, may the project proceed to pay employees at the revised (July 1, 1988) rates.

660-0107, Basic Rural Health II:

Budget #1 - SANRU/ECZ - The project is authorized to proceed immediately with implementation of the July 1, 1988 revised prime policy. The project is also authorized to employ up to an additional twenty (20) employees. However, as part of the CY 1989 budget exercise the project is requested to provide a projection of project staffing requirements through PACD.

Budget 2 - (Water/SNHR) - The project is authorized to implement the revised Prime Policy, however, as part of the CY 1989 CPF budget cycle the project will be required to provide: first - An evaluation of the impact of primes which were first authorized in CY 1986, in other words has the addition of primes resulted in increased project output? And second, a projection of project staffing requirements through PACD.

660-0114, Shaba Refugee Health - The implementation of the revised July 1, 1988 prime policy is authorized. During the CY 1989 budget exercise, project employment level will be reviewed and a comparison between project grade/salary structure and counterpart funds grade/salary structure should be provided.

660-0116, Shaba Refugee Water - Project is authorized to implement the July 1, 1988 Prime Policy.

660-0122, Kimbanguist Hospital - No primes/salaries are authorized under the project.

698-0421 - Combatting Childhood Communicable Diseases (PEV/CCCD) - Implementation of the July 1, 1988 revised prime policy is not authorized until a list of all previous excess salary/prime payments by individual has been compiled. I.G. Audit Report No. 7-660-88-12 identified 74 employees who received excess payments during 1987. All previous excess payments will be deducted from the increases authorized for individual employees under the July 1, 1988 revised prime policy. Only after a firm repayment schedule has been submitted, may the project proceed to pay employees, retroactively, at the revised (July 1, 1988) rates.

Attachments:
A. Revised Prime Policy
B. Conversion chart between American Embassy/USAID grades and GOZ grades
C. CPF Budget Form

Office of the Director

Directive No. 306
Issued October 1, 1986
Revised July 1, 1988

Subject: Counterpart Fund (CPF) Salary and Salary Premiums

A. Policy Statement:

I hereby approve, with the concurrence of the Director of the Secretariat of Counterpart Funds, the payment of base salaries and salary premiums on a selective basis to Zairian personnel employed in USAID-supported projects and activities in Zaire. Specifically, salary and salary premiums may, within the parameters of the USAID-issued "Schedule of Allowable Premiums and Maximum Salary levels", and at the discretion of the project Chief of Party, be paid to all USAID-supported project personnel. The premium shall be based on two factors: 1) the GOZ functional grade of the position; and, 2) the educational qualification of the incumbent. Further, counterpart funds may be used to pay base salaries for newly hired project staff based upon classification equivalent to GOZ functional grades. Counterpart funds are, however, not to be used for the payment of base salaries of cadre employed by the GOZ prior to the initiation of, and secondment to, the USAID-supported activity. Payment of base salaries and premiums shall be a temporary measure and shall occur only until project revenues and/or GOZ revenues or savings attributable to the project are such that the GOZ can finance personnel expenses from ordinary budget resources.

B. Implementation:

USAID's objective in implementing this policy is to ensure a competitive compensation package which is sufficient to retain and motivate project personnel. Compensation from counterpart funds shall, therefore, not diminish or displace contributions from other sources of financing, nor supplement wages, allowances or other benefits from other sources such that total compensation exceeds that which is judged sufficient to accomplish USAID's objective. The following implementation guidelines further clarify USAID intent:

1. a salary premium, or a portion thereof, may only be granted when compensation from any and all other sources for services rendered in the subject position are less than that allowed for the total salary in the "Schedule of Allowable Premiums and Maximum Salary Levels" approved by USAID and the Secretariat of Counterpart Funds;

2. any increase (or decrease) in wages received from other sources, including the GOZ, shall result in an off-setting decrease (or increase) in the CPF position grade premium (which is the difference between Total Salary and GOZ Base Salary);

3. if employees are accomodated in project owned or rented quarters, the monthly CPF position grade premium (which is the difference between Total Salary and GOZ Base Salary) should be reduced by fifty percent (for employees receiving their total salary from the CPF, the same formula will be used to reduce their salary to cover quarters provided in kind);

4. overtime compensation shall not be paid from counterpart funds to employees above the rank of "Agent de Bureau de lère classe";

5. no salary or premiums may be awarded in excess of that allowed according to the approved schedule, without the prior written concurrence of USAID;

6. employees whose compensation from other sources makes them ineligible for CPF position grade premium, can still be provided the educational premium;

7. the CPF remuneration framework applies to a twelve month year, therefore project employees compensation is restricted to twelve monthly payments of the authorized salary rates;

8. it is projects responsibility to withhold and pay appropriate income taxes such as INSS, CPR, etc as required by GOZ law.

C. Schedule of Allowable Premiums:

The following schedule of allowable premiums and maximum salary levels and the grade or grade equivalents for which they apply is hereby approved for implementation. The schedule, including the educational premium, shall be reviewed for modification and inflationary adjustment at least annually before the commencement of annual counterpart fund programming negotiations.

Table 1: REVISED CPF POSITION GRADE ALLOWABLE PREMIUM AND MAXIMUM SALARY SCHEDULE (Effective July 1, 1988)

Grade	GOZ Base Salary	Maximum Monthly Premium	Total Salary*
Directeur	Z30,000	Z29,000	Z59,000
Chef de Division	12,000	32,800	44,800
Chef de Bureau	7,700	31,500	39,200
Att. de B. de lère Classe	5,600	21,400	27,000
Att. de B. de 2ème Classe	4,550	19,450	24,000
Ag. de B. de lère Classe	3,675	11,225	14,900
Ag. de B. de 2ème Classe	3,605	9,195	12,800
Ag. Aux. de lère Classe	3,588	6,912	10,500
Ag. Aux. de 2ème Classe	3,542	5,958	9,500
Huissier	3,500	5,000	8,500

* Before award of Educational Premium

Table 2: EDUCATIONAL PREMIUM SCHEDULE
(Effective July 1, 1988)

Degree	Monthly Premium
Doctorate	Z15,000
Master/M.D.	10,500
L_2/A_o	7,500
A_1	4,500
A_2	3,000
A_3	1,500

D. Final Provisions:

1. The payment of salary premiums from the U.S. generated counterpart fund is subject to the availability of funds for this purpose.

2. This policy directive shall enter into force upon signature. The revised premium schedule shall take effect July 1, 1988.

Signature:

For the Secretariat of
Counterpart Funds

Mouyi Kumbilanga
Directeur a.i.

Date

For USAID

Joseph Goodwin
Acting Director

6/29/88
Date

USAID/Department of Plan Prime Policy
As of July 1, 1988
Grade Conversion Chart
between
Embassy Pay Plan and USAID/Department of Plan
Prime Policy and Salary Ceiling Schedule

USAID/Embassy Grade Structure	GOZ Grade Structure		Monthly Salary
Grade	Grade		
12	1	Directeur	59,000
11	2	Chef de Division	44,800
10	3	Chef de Bureau	39,200
9	4	Att. de Bureau de lère Classe	27,000
8/7	5	Att. de Bureau de 2ème Classe	24,000
6	6	Ag. de Bureau de lère Classe	14,900
5	7	Ag. de Bureau de 2ème Classe	12,800
4	8	Ag. Aux. de lère Classe	10,500
3	9	Ag. Aux. de 2ème Classe	9,500
2	10	Huissier	8,500

Plus Educational Prime

Degree	Monthly Premium
Doctorate/Ph.D.	15,000
Masters/Medical Doctor	10,500
L_2/A_0	7,500
A_1	4,500
A_2	3,000
A_3	1,500

Note: salaries include all benefits with the exception of the Educational Prime which is additional. Salaries are based upon 12 equal pay periods.

USAID/Program Office - 6/28/88

Project No. _____

1988
COUNTERPART FUND BUDGET
PERSONNEL 1/

Name	Title	GOZ Grade or Equivalent	Monthly Base Salary 2/ Source	Amount	CPF Monthly Salary Prime	Supplementary Benefits Provided Transport	Housing	Furnishings	Other 3/	Total Compensation	CPF Educational Pri Level of Education	Month Prime
Example:												
Makaku Lalabi	Account.	Att.Bur.le C	GOZ/BO	5,600	21,400	x				27,0[illegible]	A1	4,500
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

1/ List all project personnel receiving any form of compensation or CPF-financed benefits.

2/ Including any allowances or payment supplements provided from non-CPF sources.

3/ Specify other benefits provided.

4/ Attach request for exception for any employee receiving any form of compensation which exceeds the USAID salary schedule.

INERA - personnel, salary scales, benefits and budget situation

Table : INERA-personnel by grade and location, October 20, 1988.

GRADES	DG	AGR	YBI	KIS	NGA	BS	NK	MH	KB	ND	MU	GA	KR	AF	MK	MV	BI	LU	[illegible]	[illegible]	YK	TOTAL
AUT/SCIENT.																						
PDG	1																					1
DS	1																					1
DAF	1																					1
S/TOTAL	3																					3
PERS/SCIENT.																						
MR	1																					1
CP																						0
AT-R		1	6			1	1				2	1										12
AR-2			5				1				3	1	1			2	1					14
AR-1	1		10			2	7				5	2				3						30
S/TOTAL	2	1	21	0	0	3	9	0	0	0	10	4	1	0	0	5	1	0	0	0	0	57
PERS/TECHNIQUE																						
TRQ			1													1		1		1		4
TRM			8		1		1		1	1	1			1	1	2				2		19
TR		3	17			2	6		1		9	4	1	2		1		2	1	3		32
TRA		3	10			6	1	1			5	1		1		8		1	1	2	3	43
ATR			2			2	1				4	2	1			1					1	14
S/TOTAL	0	6	38	0	1	12	9	1	2	1	24	7	2	4	1	13	0	4	1	6	4	139
DCS	1																					1
D	4																					4
DD	7		3				2				2	1										14
DR	9			1		1	1									1						13
AT1	12		5				2				1		1	3	1							24
AT2	8		12	1	1	1			1		3			1	1	2				1		32
AB1	14		41	1	3	4	4	1	1		5	9	1	1	1	2	3	3	1	3	1	93
AB2	1	1	19		1	1	6	1				3	1	2	2	4	1	2	1	2	1	51
AA1		2	59		6	1	14			1	8	7	1	1	7	17	4	4	1	3	2	137
AA2	13	1	745	8	136	39	103	21	3	15	202	36	22	25	43	79	13	23	16	33	30	1612
H	6		3				3	3			1	2		1				7		1		27
TEMPS PARTIEL	2																					2
S/TOTAL	77	4	884	11	147	47	139	26	5	16	220	68	26	33	57	105	21	41	19	42	34	2014
TOTAUX	82	11	945	11	148	62	157	27	7	17	254	69	29	37	58	123	22	45	21	50	38	2213

P.S. Abbreviations are explained on the next page

Source : INERA

Research Grades at INERA

PDG :	président délégué général
DS :	directeur scientifique
DAF :	directeur administratif et financier
MR :	maître de recherches
CR :	chargé de recherches
AT-R :	attaché de recherche
AR-2 :	assistant de recherche 2è mandat
AR-1 :	assistant de recherche 1er mandat
TRQ :	technicien de recherche qualifié
TRM :	technicien de recherche de maîtrise
TR :	technicien de recherche
TRA :	technicien de recherche assistant
ATR :	agent technicien de recherche
DCS :	directeur - chef de service
D :	directeur
CD :	chef de division
CB :	chef de bureau
AT :	attaché de bureau
AB :	agent de bureau
AA :	agent auxiliaire
H :	huissier

Locations

DG :	direction générale
AGR :	
YBI :	Yangambi
KISI :	Kisangani
NGA :	Ngazi
BS :	Bambesa
NK :	Nioka
MH :	Mont Hawa
KB :	Kibangula
ND :	Ndihira
MU :	Mulungu
GA :	Gandajika
KN :	Kaniama
KP :	Kipopo
MK :	Mukumari
MV :	M'vuazi
GI :	Gimbi
LU :	Luki
KO :	Kondo
KY :	Kiyaka
YK :	

MOUVEMENT POPULAIRE DE LA REVOLUTION

REPUBLIQUE DU ZAIRE
CONSEIL EXECUTIF
DEPARTEMENT DE L'ENSEIGNEMENT SUPERIEUR & UNIVERSITAIRE ET DE LA RECHERCHE SCIENTIFIQUE

CABINET DU COMMISSAIRE D'ETAT

TABLEAU BAREMIQUE DU PERSONNEL ACADEMIQUE ET SCIENTIFIQUE DE L'ENSEIGNEMENT SUPERIEUR & UNIVERSITAIRE ET DE LA RECHERCHE SCIENTIFIQUE

G R A D E	BASE NETTE	L O G E M E N T		PRIME	NET A PAYER
		2/3	INDEMNITE		
Professeur Ordinaire Directeur de Recherche	50.000,00	33.333,00	—	26.667,00	110.000,00
Professeur Maître de Recherche	42.500,00	28.333,00	—	14.167,00	85.000,00
Professeur Associé Chargé de Recherche	35.000,00	23.333,00	—	11.667,00	70.000,00
Chef de Travaux Attaché de Recherche	20.000,00	13.333,00	—	6.667,00	40.000,00
Assistant 2ème Mandat Assistant de Recherche 2è Mandat	15.000,00	—	10.000,00	5.000,00	30.000,00

... / ...

MOUVEMENT POPULAIRE DE LA REVOLUTION

REPUBLIQUE DU ZAIRE
CONSEIL EXECUTIF
DEPARTEMENT DE L'ENSEIGNEMENT SUPERIEUR & UNIVERSITAIRE ET DE LA RECHERCHE SCIENTIFIQUE
CABINET DU COMMISSAIRE D'ETAT

TABLEAU BAREMIQUE DU PERSONNEL ADMINISTRATIF, TECHNIQUE ET OUVRIER DE L'ENSEIGNEMENT SUPERIEUR & UNIVERSITAIRE ET DE LA RECHERCHE SCIENTIFIQUE

G R A D E	BASE NETTE	L O G E M E N T		P R I M E	TRANSPORT	NET A PAYER
		2/3	INDEMNITE			
Directeur-Chef de Service	22.500,00	15.000,00	--	15.940,00	1.560,00	55.000,00
D I R E C T E U R	20.000,00	13.333,00	--	10.107,00	1.560,00	45.000,00
Chef de Division Technicien de Recherche Qualifié	15.000,00	10.000,00	--	8.440,00	1.560,00	35.000,00
Chef de Bureau Technicien de Recherche de Maitrise	11.000,00	7.333,00	--	5.107,00	1.560,00	25.000,00
Attaché de Bureau de 1è Cl. Technicien de Recherche	8.750,00	--	2.210,00	3.000,00	1.040,00	15.000,00
Attaché de Bureau de 2è Cl.	6.500,00	--	1.960,00	2.500,00	1.040,00	12.000,00
Agent de Bureau de 1ère Cl. Technicien de Recherche Assistant	6.250,00	--	910,00	1.800,00	1.040,00	10.000,00
Agent de Bureau de 2ème Cl. Agent Technicien de Recherche	4.000,00	--	860,00	1.600,00	1.040,00	7.500,00

G	ASS. NETTE	2/3	ECRETTE	DIVERS	TRANSPORT	RESTE A PAYER
Agent Auxiliaire de 1è Cl.	3.750,00	—	610,00	850,00	1.040,00	6.250,00
Agent Auxiliaire de 2è Cl.	3.350,00	—	610,00	800,00	1.040,00	5.800,00
M U I S S I E R	2.700,00	—	560,00	700,00	1.040,00	5.000,00

Fait à Kinshasa, le 03 MAI 1988

LE COMMISSAIRE D'ETAT,

Prof. LUMANI à Mama LUMANI

Membre du Comité Central du M.P.R.

AMBOF/*
REPUBLIQUE DU ZAIRE
MOUVEMENT POPULAIRE DE LA REVOLUTION
D P T. DE L'ENS. SUPERIEUR ET UNIVERSITAIRE
ET DE LA RECHERCHE SCIENTIFIQUE

Kinshasa, le .....

CABINET DU COMMISSAIRE D'ETAT

ARRETE DEPARTEMENTAL N° ESURS/CABCE/ /88 DU / /1988
PORTANT FIXATION DES AVANTAGES SOCIAUX ACCORDES AU PERSONNEL
DE L'INSTITUT NATIONAL POUR L'ETUDE ET LA RECHERCHE AGRONOMIQUES
EN SIGLE "I.N.E.R.A."

LE COMMISSAIRE D'ETAT A L'ENSEIGNEMENT SUPERIEUR, UNIVERSITAIRE ET A LA RECHERCHE SCIENTIFIQUE;

Vu la Constitution, spécialement ses articles 97 et 98;

Vu l'Ordonnance-Loi n° 82-040 du 5 novembre 1982 portant organisation de la Recherche Scientifique et Technologique au Zaïre;

Vu l'Ordonnance n° 81-160 du 7 octobre 1981 portant Statut du personnel de l'Enseignement Supérieur et Universitaire;

Vu l'Ordonnance n° 87-019 du 22 janvier 1987 portant nomination des Membres du Conseil Exécutif;

Vu l'Arrêté Départemental n° ESURS/CABCE/0002/84 du 27 janvier 1984 portant extension de l'application de l'Ordonnance n° 81-160 du 7 octobre 1981 portant Statut du personnel de l'Enseignement Supérieur et Universitaire au personnel des Instituts et Centres de Recherche;

Vu la lettre n° PCE/03/0439/88 du 5 février 1988 du Citoyen Membre du Comité Central et Premier Commissaire d'Etat portant approbation des propositions relatives à la transposition des grades du personnel scientifique, à la nomination des agents de commandement et à la fixation des avantages sociaux du personnel de l'INERA;

Vu la Recommandation n° 01-03 du Conseil d'Administration de l'INERA issu de l'Ordonnance n° 87-270 du 6 août 1987;

A R R E T E :

Article 1er : Les indemnités kilométriques pour les agents utilisant leur véhicule propre sont fixées comme suit :

01. Président Délégué Général	: 90 l/semaine
02. Autres Membres du Comité de Gestion	: 70 l/semaine
03. Directeurs Chefs de Service	: 50 l/semaine
04. Directeurs et Chefs de Station	: 40 l/semaine
05. Chefs de Division, Chefs de Bureau Administration et Finances, Responsables Administratifs de Station et Responsable du Bureau de Liaison/Kisangani	: 30 l/semaine
06. Autres agents	: 20 l/semaine
07. Utilisateurs de motos	: 10 l/semaine
08. Utilisateurs de mobylettes	: 5 l/semaine.

Article 7 : Les émoluments des Administrateurs et des Commissaires aux Comptes sont fixés comme ci-dessous :

01. Administrateurs	:	20.000,000 Z/mois
02. Commissaires aux Comptes	:	7.000,000 Z/mois

Article 8 : Les jetons de présence aux réunions du Comité de Gestion sont fixés comme suit :

01. Président	:	4.000,000 Z
02. Secrétaire	:	2.500,000 Z
03. Membres	:	2.000,000 Z.

Article 9 : Sont abrogées toutes les dispositions antérieures contraires au présent arrêté.

Article 10 : Le Secrétaire Général à la Recherche Scientifique est chargé de l'exécution du présent arrêté qui sort ses effets à la date de sa signature.-

Fait à Kinshasa, le

LE COMMISSAIRE D'ETAT,

MOKONDA BONZA

Article 2 : Les indemnités de transport pour les agents n'ayant pas de véhicule personnel et non transportés par l'INERA sont fixées comme suit :

01. Agents de commandement/DG	: 4 taxis/jour
02. Agents de commandement/BL-Kisangani	: 2 taxis/jour
03. Agents de collaboration et d'exécution DG/Kinshasa	: 5 bus/jour
04. Agents de collaboration et d'exécution BL/Kisangani	: 2 bus/jour
05. Chercheurs non véhiculés en stations	: 2 bus/jour
06. Autres agents en stations	: 1 bus/jour.

Article 3 : Les taux mensuels des indemenités de représentation sont fixées de la manière suivante :

01. Président Délégué Général	: 30.000,000 Z
02. Membres du Comité de Gestion	: 20.000,000 Z
03. Responsable de l'Unité de Programmation	: 10.000,000 Z
04. Chefs de Station	: 7.000,000 Z

Article 4 : Le complément logement est fixé comme suit :

- Président Délégué Général	: 60.000,000 Z
- Membres du Comité de Gestion	: 50.000,000 Z
- Responsable de l'Unité de Programmation, Directeur Chef de Service	: 40.000,000 Z
- Directeurs	: 30.000,000 Z
- Chefs de Division	: 25.000,000 Z
- Chef de Bureau	: 20.000,000 Z
- Attaché de Bureau de 1e classe	: 10.000,000 Z
- Attaché de Bureau de 2e classe	: 8.000,000 Z
- Agent de Bureau de 1e classe	: 7.000,000 Z
- Agent de Bureau de 2e classe	: 6.000,000 Z
- Agent Auxiliaire de 1e classe	: 5.000,000 Z
- Agent Auxiliaire de 2e classe	: 4.000,000 Z
- Huissier	: 3.000,000 Z

Article 5 : Les primes spéciales sont fixées comme suit :

01. Caissiers manipulant une somme égale ou supérieure à 2.000.000,000 Z	: 3.000,000 Z
02. Autres caissiers	: 1.500,000 Z
03. Comptables	: 2.000,000 Z
04. Agents chargés des Relations Publiques	: 2.500,000 Z
05. Personnel cabinet PDG + Secrétariat DS et DAF	: 3.500,000 Z
06. Opérateurs de phonie	: 1.500,000 Z
07. Chauffeurs	: 1.000,000 Z
08. Observateurs météo	: 500,000 Z
09. Sentinelles	: 10 % cfr. Loi
10. Infirmiers	: 25 % cfr. Loi

Article 6 : Les primes de diplôme sont fixées de la manière suivante :

01. Doctorat	: 10.000,000 Z
02. Ingénieur agronome, Médecin	: 7.000,000 Z
03. Licence	: 5.000,000 Z
04. Graduat	: 3.000,000 Z
05. Niveau A.2.	: 2.000,000 Z
06. Niveau A.3.	: 1.000,000 Z

../...

	2.775.824	2.159.449	616.375
	2.775.824	719.816	2.055.[illegible]
	2.775.824	719.816	2.055.[illegible]
	2.775.824	719.816	2.055.[illegible]
	2.775.824	719.816	2.055.[illegible]
	2.775.824	925.274	1.850.[illegible]
	2.775.824	925.274	1.850.[illegible]
	2.775.824	925.274	1.850.[illegible]
	2.775.824	1.086.943	1.688.[illegible]
	2.775.824	925.277	1.850.[illegible]
	2.775.824	925.277	1.850.[illegible]
	2.775.824	925.277	1.850.[illegible]
[illegible]	[illegible]	11.677.369	[illegible]

Fait à Kinshasa, le

ADMINISTRATEUR DIRECTEUR
TECHNICO-COMMERCIAL & FINANCIER

LE PRESIDENT SECTIONNAIRE DU CONSEIL
ET PRESIDENT DELEGUE GENERAL

ONYEMBE PEKE MINU[illegible]

ANNEX 21

INSTITUT NATIONAL POUR L'ETUDE ET LA
RECHERCHE AGRONOMIQUES
"I.N.E.R.A."

TABLEAU SUR L'ETAT D'AVANCEMENT DE LA RESTRUCTURATION DE L'I.N.E.R.A.

3 OCTOBRE 1988

N°	ACTIONS RECOMMANDEES	NIVEAU D'EXECUTION	CE QUI RESTE A FAIRE	POINT DE BLOCAGE
01	Transfert phys. de la D.G. de Ybi à KINSHASA	- L'IZCN a déjà réalisé les deux niveaux prévus du bâtiment sis n°13 Av. des Cliniques + un local de la cave comme magasin. -Tous les agents retenus à la nouvelle D.G sont déjà en activité. Les dossiers et effets personnels des agents ont été ramenés à Kinshasa -La DG est bel est bien installée à Kinshasa La peinture est déjà achetée par l'I.N.E.R.A. pour rafraichissement des bureaux -La toiture est completement reparée. -Les travaux de peinture ont été achevés. -L'INERA a introduit un bon de commande d'equipements auprès du PNUD.	- Achat de l'équipement complet des différents bureaux dans le cadre du Budget PNUD. - Exécution des bons de commandes déjà introduits au PNUD	
02	Etalissement au sein de L'Administrat° Centrale d'une Unité de planication et de Programmation de la Recherche	L'Unité de Progr. a déjà été installée et fonctionne depuis septembre 1987. -Mise en application Projet PNUD -Renforcement de l'U.P. par l'engagement de Cit. MANKANGIDILA. -Introduction par l'INERA auprès de PNUD d'un bon de commande des moyens logistiques pour l'U.P. -Mise au point du 1er schéma de planification de la recherche.	- Démarrage des travaux sur terrain (missions NDUNGA et RAMAZANI sur l'état de la situation des cultures perennes à l'INERA). - Recrutement du C.T.P - Interview des candidats la semaine prochaine au siè-	- Recrutement du C.T.P dans le cadre du Projet PNUD

		!-Elaboration d'un document sur la stratégie de la recherche. !-Désignation BINSIKA à la tête de l'U.P. !-Renforcement U.P. par engagement MANKANGIDILA et MAKOKO !-Démarrage des travaux sur terrain	ge de l'ISNAR.	
03	Préparation de procédures opérationnelles et composition du Conseil d'Adm. de l'I.N.E.R.A.	!-L'INERA a été doté d'un nouveau C.A. et d'un nouveau Comité de Gestion. depuis le mois d'août 1987. !-Mise au point du schéma de planification de la recherche agronomique. !-démarrage de l'élaboration des programmes de recherche sur les spéculations agricoles	!-Définition du rôle du Comité Scientifique Consultatif et sa mise en place - préparation des programmes de recherche thématique !- interview pour mi-octobre 1988	!- Recrutement d'un C.T.P

N°	ACTIONS RECOMMANDEES	NIVEAU D'EXECUTION	CE QUI RESTE A FAIRE	POINT DE BLOCAGE
04	Formalisation des relations interinstitutionnelles et interdépartementales pour la recherche agricole	!- L'INERA a signé des conventions avec RAV, BUNASEM PNE, Projet Fruit-Vivres. L'INERA avait déjà conclu des accords de collaboration avec FAO, IRAZ,CIAT,PRAPAC CIP et prochainement CIPEA !- L'INERA collabore avec ISABU, ISAR, IITA.	!- Elargir le champs de collaboration avec d'autres organismes de recherche agricole tant nationaux qu'internationaux (le C.G.E.A,...etc..) - signature de la Convention avec CIPEA et d'autres organismes présentés. !- la convention CIPEA-CEE attend la signature de deux parties	

		- CIPEA vient d'envoyer toute la documentation relative à sa mission et à ses structures pour le département des Affaires Etrangères et de la Coopération Internationale en vue de la signature de la convention avec INERA - L'INERA vient de signer une convention avec le Département du Développement Rural dans le cadre d'un projet appelé "Développement rural de Kabare" financé par la Coopération Allemande. - signature d'un accord de collaboration avec CODENORD pour la multiplication de semences de base de coton et légumineuses		
	Conclusion d'un contrat avec PNUD pour le détachement d'un Conseiller Permanent	- Une mission conjointe ISNAR-FAO a séjourné à Kinshasa du 03 au 14 novembre 1987. - Une mission de l'ISNAR conduite par Monsieur ROCHETEAU a séjourné à Kinshasa du 29.5 au au 9.6. 88. - Signature projet PNUD dont l'exécution est confiée à l'ISNAR.	Recrutement du C. T. P.	
05	pour la gestion de la Recherche Agricole selon les recommandations ISNAR.			

N°	ACTIONS RECOMMANDEES	NIVEAU D'EXECUTION	CE QUI RESTE A FAIRE	POINT DE BLOCAGE
	La préparation d'1 plan directeur pour la Recherche Agricole.	- Assistance experts ISNAR + FAO pour la déf. de la procédure du travail (nov. 1987) - Récolte informations l'Unité de Programmat. - Ebauche 1er schéma - Signature Projet PNUD	- Achat par le PNUD des équipements et moyens logistiques pour l'U.P.	
06				

! !		!- Renforcement de l'U.P.	!	!
! ! Déf.d'un méca-		!Les stations de BO-	!	!
!07! nisme pour la		!NGABO et BOKETA ont	!	!
! ! cession des		!été transférées au	!	!
! ! stations de		!Dpt. du Portefeuil-	!	!
! ! recherche non		!le en Juillet 1987.	!	!
! ! retenues dans		!	!	!
! ! le dispositif		!Pour les stations	!	!
! ! actuel de		!restantes (GIMBI,	! - Signature des	!
! ! l'I.N.E.R.A.		!KONDO,NDIHIRA,MONT-	! contrats de	!
! !		! HAWA, KANIAMA, KI-	! location-gé-	!
! !		!BANGULA, MUKUMARI,	! rance avec les	!
! !		!NGAZI + plantations	! locataires re-	!
! !		!et usines de Ybi),	! tenus.	!
! !		!des partenaires	!	!
! !		!possibles ont été	!	!
! !		!identifiées.	!	!
! !		!	!	!
! !		!Des propositions de	!	!
! !		!modalités de ces-	!	!
! !		!sion ont été	!	!
! !		!approuvées par	!	!
! !		!le Conseil Exécutif.	!	!
! !		!-Lettres du Comité de	!	!
! !		! Géstion aux candidats	!	!
! !		! locataires pour complé-	!	!
! !		! ter leurs dossiers avant	!	!
! !		! de les soumettre pour	!	!
! !		! apporbation du C.A/INERA	!	!
! !		!- privation des	!	!
! !		! stations abandon-	!	!
! !		! nées par la signature	!	!
! !		! Arr.Dpt. n°044/88 du	!	!
! !		! 2.3.88 portant leur	!	!
! !		! cession au Dpt.Portef.	!	!

N°	ACTIONS RECOMMANDEES	NIVEAU D'EXECUTION	CE QUI RESTE A FAIRE	POINT DE BLOCAGE
! !		!- location-gérance	!	!
! !		! des stations ac-	!	!
!07!		! tuellement en ac-	!	!
! !		! tivité et non re-	!	!
! !		! tenues.	!	!
! !		!- Adoption du projet de	!	!
! !		! contrat de location-	!	!
! !		! gérance par le C.A. de	!	!
! !		! l' INERA.	!	!
! !		!- Fixation du taux de lo-	!	!
! !		! yer théorique par le	!	!
! !		! C.G. de l'INERA.	!	!

	Allocation budgets appropriés.	Décaissement de 15 mions de Z du budget d'investissement 1987 au profit de la Société EXTRABOIS qui a déjà fourni 10 motopompes, 10 motos Yamaha et 4 groupes électrogènes et différentes pièces de rechange - Signature Projet PNUD - Octroi d'un prêt par la B.M. au C.E pour la restructuration de l'INERA et la relance de la recherche agro. - Paiement de 3 nouvelles tranches à la société EXTRABOIS (totale de 52 milions de Zaires). - libération de la 1ère tranche des fonds de la B.M. (100.000 US$) - démarrage des études dans le cadre des fonds de la B.M	EXTRABOIS doit encore fournir 3 groupes élect. 30 motos, 2 moteurs hors- bord et pièces de rechange. - La libération des fonds par la B.M.	- Libération du PIP. - Paiement du relicat à l'EXTRABOIS par le Département du Plan (17 milions de Zaïres) sur le B.I.87. - Libération du B.I 88.
09	Rétablissement de la Commission interdépartementale chargée du suivi de la restructuration de la Recherche Agronomique.	- Commission opérationnelle depuis le 12 octobre 87. - La Commission se réunit régulièrement - paiement des émoluments des membres de cette commission		- Caractère aléatoire de libération du budget de fonctionnement. - Montant de fonctionnement réduit alloué à l'INERA.

N°	ACTIONS RECOMMANDEES	NIVEAU D'EXECUTION	CE QUI RESTE A FAIRE	POINT DE BLOCAGE
	Formulation des nouveaux statuts d'engagement chercheurs	le service juridique du Pouvoir de Tutelle parachève actuellement la	Discussion du Rég. d'Ord. Intérieur avec la nouvelle déléga-	- Manque des fonds de fonctionnement pour couvrir les frais de déplace-

10	et du personnel d'appui à la recherche.	toilette des textes portant nouveau statut du personnel de la recherche.	tion syndicale nationale. - Dépôt projet statut au Conseil Exécutif pour approbation avant la sanction Présidentielle.	ment des nouvelles unités.
		- Un nouveau Règlement d'Ordre Int. est à l'étude tenant compte de la restructuration.		
		Les arrêtés portant grades du personnel de la recherche (chercheurs, Techniciens de recherche), confirmation aux grades de commandement du pers. administratif et fixation des avantages sociaux ont été signés par le Commissaire d'Etat à l'ESURS après approbation par le 1er Commissaire d'Etat.		
		Les décisions de promotion du pers. de collaboration et d'exécution ont été signées par le PDG.		
		L'autorité de tutelle a autorisé l'INERA a étoffé l'équipe des chercheurs et des techniciens de recherche.		
		-Achat billets de voyage du personnel engagé		

Article 11 : Le Projet de Recherche Agronomique Appliquée et de Vulgarisation peut recourir, par le biais de l'autorité de tutelle aux services d'experts ou des organismes tant nationaux qu'internationaux ayant une compétence particulière qui ne saurait être couverte par ses propres ressources humaines. Il en est de même pour tous les autres contacts avec les organismes et instituts de recherche extérieurs.

Article 12 : Le Projet de Recherche Agronomique Appliquée et de Vulgarisation prend à son compte tout le patrimoine, toutes les activités et tout le personnel des Programmes Nationaux Sectoriels existants : le Programme National Maïs, le Programme National Manioc, le Programme National Légumineuses et ceux à venir.

Article 13 : Les Secrétaires Généraux des deux Départements sont chargés chacun en ce qui le concerne de l'exécution du présent arrêté qui entre en vigueur à la date de sa signature.

Fait à Kinshasa, le 14 05 1985

KANDE BULOBA KASUMPATA

COMMISSAIRE D'ETAT A LA RECHERHCE SCIENTIFIQUE.-

BOKANA w'ONDANGELA.-

COMMISSAIRE D'ETAT A L'AGRICULTURE ET AU DEVELOPPEMENT RURAL.-

suivant les modalités prévues dans la convention particulière signée le 27 Novembre 1984 à cet effet avec cet Institut.
En rapport avec le développement des activités, le projet peut aménager des nouvelles stations et infrastructures de recherche agronomique appliquée.

Article 6 : La Direction du Projet de Recherche Agronomique Appliquée et de Vulgarisation est assumée par un fonctionnaire du Département de l'Agriculture et du Développement Rural, appelé Coordinateur, et qui a rang de Chef de Division.

Article 7 : Le Coordinateur est responsable de la gestion quotidienne du projet et est tenu d'en rendre compte régulièrement à l'autorité de tutelle.
Il coordonne les activités des différents programmes nationaux sectoriels et veille à la conformité des programmes de recherche avec les priorités définies par les deux Départements concernés.

Article 8 : La Coordination du Projet de Recherche Agronomique Appliquée et de Vulgarisation comprend un Service Administratif et Financier ainsi qu'un Service Technique.

Article 9 : Le Service Administratif et Financier assure le suivi et le contrôle de la gestion administrative et financière et celle du personnel attaché aux différents Programmes Nationaux de Cultures Vivrières.

Article 10: Le Service Technique est notamment chargé de proposer les programmes de recherche du Projet en concertation avec les directions des Programmes Nationaux Sectoriels; d'assurer le suivi et l'orientation des activités de recherche au sein du Projet.

ANNEX 23

PROJET RAV (091)

PROPOSITION DE BUDGET 1989

POSTES	COORDINATION	P N L	P N M	PRONAM	TOTAL
PERSONNEL	13.854.000	56.080.000	42.817.710	77.194.632	189.947.237
Salaire de base	2.135.184	13.734.000	8.583.828	23.780.820	48.233.832
Primes	8.394.072	35.288.000	22.723.572	41.451.972	107.857.616
Soins médicaux	2.880.000	6.405.000	10.710.000	10.967.160	30.962.160
Charges sociales	445.639	653.000	800.310	994.680	2.893.629
TRANSP./DEPLACEMENT	31.416.033	23.805.000	25.144.149	45.037.817	125.402.999
Frais de mission	12.384.753	9.898.000	7.173.542	17.501.373	46.957.668
Billets transport	7.932.280	3.664.000	3.448.938	2.362.202	17.407.420
Entre/Rép. véhic.	8.115.000	4.705.000	9.625.000	16.979.696	39.424.696
Assurance véhic.	338.000	630.000	1.175.000	2.825.646	4.968.646
Provision accident	270.000	365.000	500.000	820.000	1.955.000
Carburant	2.376.000	4.543.000	3.221.669	4.548.900	14.689.569
FRAIS BUREAU	24.592.684	6.328.000	9.602.018	6.964.898	47.487.600
Equipement	2.889.184	2.759.000	2.988.368	2.891.675	11.528.227
Fournitures	4.478.000	2.079.000	4.072.450	1.574.423	12.203.873
Frais banque	240.000	515.000	277.200	877.000	1.909.200
Imprimés	664.000	675.000	800.000	1.121.900	3.260.900
Entretien	1.884.000	300.000	1.464.000	499.900	4.147.900
Loyer bureau	14.437.500	—	—	—	14.437.500
STATION	-	29.732.000	18.356.475	30.435.969	78.524.444
Entre/Rép. véhic.	-	2.400.000	2.550.000	5.267.716	10.217.716
Assurance véhic.	-	300.000	150.000	926.500	1.376.500
Provision accident	-	200.000	500.000	300.000	1.000.000
Carburant véhic.	-	2.700.000	120.000	1.188.011	4.008.011
Entre/Rép. tracteurs	-	1.881.000	1.557.600	2.996.058	6.434.658
Carburant tracteurs	-	1.500.000	1.333.400	1.810.952	4.644.352
Entretien station	-	2.757.000	1.184.300	7.340.043	11.281.343
Construction	-	-	-	-	-
Equipemetn recherche	-	5.943.000	6.178.500	5.387.694	17.509.194
Fourniture recherche	-	8.133.000	4.344.675	4.519.155	16.996.830
Carburant G.E.	-	3.918.000	438.000 (1)	699.840	5.055.840
RECEPTION/MANIF. MPR	1.384.000	1.055.000	1.200.000	+ cab. 1.297.750	4.936.750
Réception/FIKIN	1.084.000	305.000	300.000	447.750	2.136.750
Manifestation MPR	300.000	750.000	900.000	850.000	2.800.000
ACTIVITES SC ET FOR	5.818.949	-	-	-	5.818.949
Ateliers, stages de formation et	3.318.949	-	-	-	3.318.949
relations publiques	2.500.000	-	-	-	2.500.000
	77.066.561	117.000.000	97.120.352	160.931.066	452.117.979

ANNEX 24

5 December, 1988

BUDGET RATIOS 1989

	COORDINATION	PNL	PNM	PRONAM	TOTAL
PERSONNEL	17.98	47.93	44.09	47.97	42.01
SALAIRE	15.40	24.49	20.05	30.81	25.40
PRIMES	60.59	62.92	53.07	53.70	56.78
MEDICAUX	20.79	11.42	25.01	14.20	16.30
SOCIALES	3.22	1.17	1.87	1.29	1.52
TRANSP/DEPLA	40.76	20.34	25.88	27.98	27.74
MISSION	39.42	41.58	28.53	38.86	37.45
BILLETS	25.25	15.39	13.72	5.24	13.88
ERTR/REP	25.84	19.76	38.28	37.70	31.44
ASSURANCE	1.07	2.65	4.67	6.27	3.96
PROVISION	.86	1.54	1.99	1.83	1.56
CARBURANT	7.56	19.08	12.81	10.10	11.71
FRAIS BUREAU	31.91	5.41	9.89	4.33	10.50
EQUIPMENT	11.75	43.60	31.12	41.52	24.28
FOURNITURE	18.21	32.85	42.41	22.61	25.70
FRAIS BANQUE	.98	8.14	2.87	12.59	4.02
IMPRIMES	2.70	10.67	8.33	16.11	6.87
ENTRETIEN	7.66	4.74	15.25	7.18	8.73
LOYER	58.70	-	-	-	30.40
STATION	-	25.41	18.90	18.91	17.37
ENTRE/REP	-	8.07	13.89	17.31	13.01
ASSURANCE	-	1.01	.83	3.04	1.75
PROVISION	-	.67	2.72	.99	1.29
CARBURANT	-	9.08	.65	3.90	5.10
ENTRE/REPTRAC	-	6.33	8.48	9.84	8.19
CARBURANT TRAC	-	5.05	7.26	5.95	5.91
ERTRETIEN	-	9.27	6.45	24.12	14.37
CONSTRUCTION	-	-	-	-	-
EQUIPMENT RE	-	19.99	33.66	17.70	22.30
FOURNITURE RE	-	27.35	23.67	14.85	21.64
CARBURANT GE	-	13.18	2.39	2.30	6.44

RECEPTION	1.79	.91	1.24	.81	1.09
RECEPTION FIK	78.32	28.91	33.00	34.50	43.27
MANIFESTION	21.68	71.09	66.00	65.50	56.73
ACTIVITIES	7.56	-	-	-	1.29
ATELIERS	57.04	-	-	-	57.03
RELATIONS	42.96	-	-	-	42.97
TOTAL	17.05	25.87	21.48	35.60	100

crop improvement programs (b) a farming systems research program capable of identifying production constraints, developing or adaptating technology to relieve these constraints, and ensuring it's relevance by testing under actual farm condtions and (c) an outreach component that ensures that results of this research are available to the agencies and organizations that will pass it on to farmers. This is a very ambitious undertaking but these objectives seemed attainable in 1985 and 1986. However, the financial picture has changed drastically since then. Now, either more funds must be found or the Project objectives must be revised. Such revision would be difficult and painful because plans and committments have been made and courses of action have been laid out, but it is essential if funding cannot be improved. To try to meet the Project objectives as they now stand without improvement of the financial situation will be unproductive and eventually end in failure. If all parties involved, USAID, GOZ and IITA, are aware of this crisis and work together I trust a solution can be found.

Sincerely,

Frank E. Brockman

Frank E. Brockman

cc: Mr. J. Mitchell
Mr. M. Jacobs
Dr. L.D. Stifel
Dr. J. Eckebil
Dr. K. Fischer
Cit. Mota
Dr. Lutaladio
Cit. Wanza/Mr. Servant
Directors/Principal Advisors:
PRONAM
PNM
PNL

N.B.: All the foregoing discussion is in terms of comparison with 1985/86 budgets as a standard. In actual fact, it would have been reasonable to have expected an increase in budgets since 1985 because "building a research institution" implies growth and development. The most important aspect of this is development of staff. Since 1985, twenty national staff at level of A, or higher have been recruited to fill scientific posts and meet staff development objectives of the Project. In addition, seven new technical assistance positions under the USAID/IITA Cooperative Agreement have been filled. With this increse in senior staff, there should be a concomitant increase in activities. Therefore, it is reasonable that during this period in the development of the Project, there would have been an increase in funding needs. But, to the contrary, operating funds (in real terms) have been drastically cut.

ANNEX 26

UNITED STATES GOVERNMENT

memorandum

DATE: December 8, 1988

Y TO
N OF: Hope Goodwin, Project Accountant

T: Project 660-0091 Expenditures per Fiscal Year

TO: Linda Brown

Per your request, I have done an analysis of expenditures per fiscal year for Project 660-0091 and broken them down per following elements:

Element	1985	1986	1987	1988
TRAINING	52,409.50	405,947.72	709,929.01	369,284.55
TECHNICAL ASSISTANCE	202,072.23	903,474.78	1,553,976.46	2,222,606.29
COMMODITIES	-0-	76,319.00	104,639.10	40,432.92
OTHER COSTS	14,429.23	104,387.52	18,979.61	(5,634.49)
TOTALS	268,910.96	1,490,129.02	2,387,524.18	2,626,689.27

Let me know if I can be of any further assistance.

OPTIONAL FORM NO. 10
(REV. 1-80)
GSA FPMR (41 CFR) 101-11.6
5010-114

N°	ACTIONS RECOMMANDEES	NIVEAU D'EXECUTION	CE QUI RESTE A FAIRE	POINT DE BLOCAGE
		-L'engagement des nouvelles unités chercheurs et techniciens de recherche a déjà été effectué. -Amélioration des conditions salariales du personnel INERA depuis le 20 mai dernier -Organisation de la réunion syndicale nationale à Kisangani du 1er au 4 juillet 1988. -Signature d'un R.O.I. de la délégation syndicale nationale.		

Fait à Kinshasa, le 03 OCTOBRE 1988

LE PRESIDENT SECTIONNAIRE DU M.P.R.
ET PRESIDENT-DELEGUE GENERAL,

Dr. Ir. ONYEMBE PENE MBUTU LOLEMA.-

REPUBLIQUE DU ZAIRE
CONSEIL EXECUTIF
DEPARTEMENT DE L'AGRICULTURE ET
DU DEVELOPPEMENT RURAL

Kinshasa, le .....

ANNEX 22

LE COMMISSAIRE D'ETAT

10 DEC 1985

ARRETE INTERDEPARTEMENTAL N° 000/1/85 DU
PORTANT CREATION ET ORGANISATION D'UN PROJET DE
RECHERCHE AGRONOMIQUE APPLIQUEE ET DE VULGARISA-
TION EN ABREGE "R A V ".-

==========

LES COMMISSAIRES D'ETAT A L'AGRICULTURE ET AU DEVELOPPEMENT RURAL ET A LA RECHERCHE SCIENTIFIQUE ,

Vu la Constitution, spécialement en son article 98 ;

Vu l'Ordonnance n° 85/176 du 5 Juillet 1985 portant nomination des Membres du Conseil Exécutif ;

Vu l'accord de crédit signé le 13 Septembre 1983 entre la République du Zaïre et les Etats-Unis d'Amérique ;

Le Conseil Exécutif entendu :

A R R E T E N T :

Article 1er : Il est créé au sein du Département de l'Agriculture et du Développement Rural un Projet de Recherche Agronomique Appliquée et de Vulgarisation en abrégé "R A V" chargé de coordonner les Programmes Nationaux de Cultures Vivrières et d'y développer les activités de recherche agronomique appliquée et de vulgarisation.

Article 2 : Le Projet de Recherche Agronomique Appliquée et de Vulgarisation est placé sous le contrôle direct du Commissaire d'Etat à l'Agri-

-/.

culture et au Développement Rural en ce qui concerne son exécution, et du Commissaire d'Etat à la Recherche Scientifique en ce qui concerne la programmation scientifique.

Article 3 : Le suivi du projet sera assuré au niveau des Départements par la Direction de l'Administration Générale des Projets (Département de l'Agriculture) et par la Direction de la Coordination Scientifique (Département de la Recherche Scientifique).

Article 4 : Le Projet de Recherche Agronomique Appliquée et de Vulgarisation est chargé spécialement :

- de développer à travers les programmes nationaux sectoriels la recherche agricole appliquée sur les principales cultures vivrières de consommation nationale notamment les céréales, les légumineuses alimentaires et les plantes à tubercules.

- d'orienter la recherche agricole vers la mise au point des techniques culturales appropriées ainsi que des variétés plus productives et plus résistantes aux maladies et aux insectes et adaptées aux diverses conditions écoclimatiques du pays.

- d'assurer, au moyen de cette recherche, la production des semences de fondation pour les différentes variétés des cultures devant être recommandées auprès des agriculteurs.

- de vulgariser les résultats de la recherche agronomique appliquée en milieu rural.

Article 5 : Le Projet de Recherche Agronomique Appliquée et de Vulgarisation exerce ses activités sur toute l'étendue du territoire national.
Il développe la plupart de celles-ci dans les stations et les infrastructures de recherche de l'Institut National pour l'Etude et la Recherche Agronomique en abrégé "INERA" et ce,

-/.

ANNEX 27

8 December, 1988

IITA Comments on progress towards goals listed in IITA/USAID Attachment 2, pp23-25 of Cooperative Agreement

The goals listed in the Cooperative Agreement (attachment 2, p23-25) toward which substantial progress is to have been made are not very clearly described. Neertheless, this is an attempt to provide a brief summary of progress towards the goals as the writer can best interpret them. A fully documented report of accomplishments, which will be prepared at the end of the Project will take considerable time to prepare and this report remains a rather subjective resume of progress. However, it may be useful as a statement against which the evaluators may wish to compare their own observations.

The following refers to goals, one by one, as listed in the Cooperative Agreement:

(a) An applied research program for improvement of cassava, maize and grain legume production is in place at three prinicpal research stations and seven substations/test sites. Research on genetic improvement and improvement of cultural practices is being carried out. A FSR component is incorporated into the RAV research program and is identifying production constraints and opportunities for relieving them and testing innovations under farm conditions. The organization and operation of FSR% in RAV is described in the document "La Recherche sur les Systemes de Production au RAV".

(b) Training for FSR has been accomplished through two training workshops (two weeks duration each) and on-the-job training. Methods being used in FSR are standard methods (as described in Mutsaers, et. al. "A field guide for on-farm research").

To ensure that newly developed technology benefits the small farmer, RAV has adopted the strategy of working through organizations that have cntact with farmers and have the capacity to pass new technology on to them. This involves training personnel of these agencies in the use of the new technology and in methods of transfering it to farmers. During the period of the cooperative agreement, 163 agents of collaborating organizations have received formal training of this type.

(c) A research organizational structure and managerial system has been developed which provides for establishing priorities, planning, programming, budgeting, implementation and evaluation. The primary venue for appraisal of priorities, planning, programming and evalaution is the RAV annual Scientific Meeting (which is preceded by internal reviews within each Program) in which results from the previous year are reviewed and plans for future work are presented, discussed and finalized. In

addition to senior RAV staff, ths meeting involves invited resource persons, collaborators in research, outreach, seed production, etc. and others with a strong interest in RAV activities. Monitoring of work during the year is carried out by the Service Technique of the Coordination Unit. Budget preparation follows the annual Review and is based on the work plans approved at this meeting. Budget preparation starts at the Section level in each Program. In preparation of the 1989 budget, a new system was introduced whereby each experiment/activity is individually costed. Activities are ranked according to priority and if sufficient funds are not received to support all activities, those with the lowest priority are cut. After Section heads defend their budgets before the Program Director/Prinicpal Adviser, a Program budget proposed is prepared. These are defended by Directors/Principal Advisers in meetings with the Coordination Unit. Budgets are worked out at this meetng for each Program and the Coordination Unit which in total is expected to be acceptable to USAID. This budget is then presented with full supporting documentation to USAID.

(d) Improved varieties of cassava, maize and grain legumes are being developed/selected. These are being tested under farm cnditions by the FSR units. Varieties ready for, or near to, release are: maize - Babungu 3, DMR-ESR(W); cassava - 40230/3; groundnuts - JL24; soybean - TGX842-294D and TGX814-26D; beans - NAKAJA, KIRUNDO and NAINE DE KYONDO. Foundation seed of improved varieties is being produced and production in 1987/88 was: maize - 4030kg; grain legumes - 3040kg. For cassava, 606880m of cyttmap were produced. An active program for demonstration, multiplication and distributions has been underway in Bas Zaire and Bandundu (where IITA extension agronomists have been posted) since 1982. Outreach activities are less developed in the Kasais and Shaba mainly because of lack of qualified staff to provide leadership.

(e) It is not clear what is meant by "improving the research stations' agronomic practices". Research to develop improved agronomic practices for farmers is being carried out on the stations. This includes the cultural practices mentioned as well as others.

(f) Major constraints have been identified by surveys and on-going observations in the various target areas. These are described in the reports of the surveys: "Enquete exploratoire du zone forestiere de Kasangulu et Madimla, Bas Zaire", "Enquete exploratoire aux environs de M'vuazi", "Enquete des contraintes a la production dans le zone de Lubumbashi". These constraints are being addressed by on-station trials to develop new technology and on-farm trials to verify its appropriateness under farmers' conditions.

(g) Low soil fertility is recognized as a major constraint and strong emphasis is being place on developing economically sound means of maintaining or improving fertility levels. This includes work on alley cropping, rotations, intercropping, fallows, lining, fertilizer, etc.

(h) The Project Paper foresaw the establishment of a soil mapping and classification unit. This was to be staffed by Zairean scientists who its was assumed would be incorporated into the Project. Technical assistance was to be provided to the unit ona consultant basis. However, none of the five national scientists mentioned in the Project Paper became available to the Project.

(i) As mentioned in (d), an active program for demonstration, multiplicatino and distribution of improved cassava varieties with collaborating organizations has been underway in Bas Zaire and Bandundu (where IITA extension agronomists have been posted) since 1982. Major collaborators in Bas Zaire include le Centre de DEveloppement Communicataire de l'Eglise de Christ au Zaire de Kampese (CeDeCo), l'OXFAM, le Projet de Developpement Rural Integre de Mbanza-Ngungu (PRODERIM), le Projet Stalo-Zairois de Luala, le Centre de Developpement Endogene baysam (CDEP), l'Institute Technique Agricole de Gombe Matadi (I.T.A./Gombe Matadi), le Programme National Engrais-FAO (PNE-FAO), l'associatin pour la Promotion du Developpement Endogene des Communantes de Base (APRODEC), and l'Annee de Salut. In Bandundu, principal collaborators are: l'Association de Planteurs pour le Developpement Rural de Nko Zone de Bulungu (APD), le Bureau National Semancier (BUNASEM), le Centre Agricole de Lusekele (CAL), le Centre de Sante de Bokoro, le CODAIK, les Collectivites de Mudikalunga et Yassa-Ickwa, le Developpement Progres Populaire d'drofa (DPP), l'Englise Kimbangiste, l'Eglise Protestante CEB"IE, l'Eglise Protestante CEFMZ a Kajyi et a Kikwit, la ferme Agri-Bandundu/Muyulu, l'Inspection Agricole de Gungu, l'Institute Technique Agricole de Lamba, le Madail Intshima, l'Orphelmat Intshwerm, le Projet Pisciculture Familiale (PPF) a Gungu et Kikwitard PROCAR (USAID Projet 102).

(j) See discussion of Short and Long term (degree) trainiing under "Attainment of Benchmarks".

(k) see (d).

ANNEX 28

8 December, 1988

IITA Comments on Attainment of Benchmarks set forth in IITA/USAID Cooperative Agreement pp3-6

The benchmarks listed in the USAID/IITA Cooperative Agreement relate to seven areas:

(1) Staffing of T.A. positions
(2) Implementation of FSR Program
(3) Commodity Procurement
(4) Short term training
(5) Long term degree training
(6) Preparation of work plans
(7) Submission of quarterly reports

The dates by which specific objectives within each area attained are given below.

(1) Staffing of T.A. positions. The Cooperative Agreement called all positions to be filled within the first three months. This, of course, wa not realistic in view of the time required for recruitment and staffing occurred as follows:

The following staff were in place at the start of the Cooperative Agreement (havng served under the predecessor, Cassava Outreach Project): Chief of party, Administrative Officer, Farm Manager, Services Engineer, Agronomist/Gandajika, Entomologist, Training/National Outreach Specialist, Regional Outreach Specialist/M'vuazi and Regional Outreach Specialist/Kiyaka.

The remaining positions were filled as follows:

Plant Breeder - Maize	September 1985
Socio-economist/M'vuazi	January 1986
Agronomist/M'vuazi	January 1986
Socio-economist/Lubumbashi	September 1986
Plant Breeder - Legumes	September 1986
Agronomist/Lubumbashi	June 1987

(2) Implementation of FSR Program. As laid out in the Cooperative Agreement, FSR was to be implemented in four target areas and was to involve two in-country training courses.

In-country training courses. A two week training workshop was held at Mbanza-Ngungu in December 1985 to introduce 22 personnel of RAV, USAID and certain collaborating agencies to the concepts of on-farm research and train them in procedures including: choice of target area and representative pilot research area, collecting and analyzing existing

information, conducting exploratory survey, determining constraints and opportunities for improvement and designing on-farm trials. Three resource persons from IITA-Ibadan and two from FSSP were utilized.

A similar training workshop was conducted at Lubumbashi in January 1987.

PRONAM FSR. At the start of the Cooperative Agreement, PRONAM already had a FSR program in operation in the Kisantu area. This had been initiated with assistance from IITA-Ibadan staff and involved a diagnostic survey and subsequent on-farm trials.

A second diagnostic survey was conducted in the Kasangulu/Madimba target area in June, 1986. This was followed by initiation of on-farm trials in the 1986/87 season.

A third diagnostic survey was carried out in the M'vuazi target area in July 1987 and it was likewise followed by initiation of on-farm trials in the 1987/88 season.

PNM FSR Program. On-farm research began in the Lubumbashi target area in the 1986/87 cropping season with the arrival of the Socio-economist/ Lubumbashi. A production constraints survey was conducted in April, 1988.

PNL FSR Program. FSR work was initiated in April, 1987 with a preliminary survey to identify pilot research areas in the Gandjika target area (prior to the arrival of the Legume Breeder, the agronomist had been fully occupied with germplasm evaluation and on-station agronomic work). One hundred ninety-nine on-farm trials were then carried out in the 1987/88 cropping year.

FSR Workshops. Although not specified as a benchmark in the Cooperative Agreement, an important event in the development of the FSR component of the RAV research program was the holding of an FSR workshop in May, 1988. This was to bring together researchers from the three programs and provide a forum for the exchange of experiences and ideas as FSR becomes an established part of RAV's research program. Reports wer made on exploratory surveys and on-farm trials and a visit was made to obsercve PRONAM on-farm research in progress at a nearby OFR site. Dr. Mutsaers, FSR specialist, IITA-Ibadan participated as a re source person and made presentations on data analysis. It is planned that such workshop will henceforth be held annually.

(3) Commodity procurement. The Cooperative Agreement (Benchmarks) called for identification of commodity requirements and initiation of commodity procurement in the first quarter, 1986.

In actual fact, the first purchase request was submitted in July, 1985 and other requests for major orders of farm equipment, laboratory equipment, field research equipment and vehicles were placed between then and July 1986. A request for a major order f tractors and farm equipment was not made until October, 1987 as it had previously been understood that BUNASEM would provide this equipment.

Actual procurement was out of the hands of the technical assistance team but extreme delays have been experienced.

(4) Short-term training. The cooperative Agreement (Benchmarks) specified short term trainng for fourteen participants as follows:

IITA	7
CIAT	2
U.S. University	2
ICRISAT	2
CIMMYT	1

In actual fact, short term training far exceeded that specified:

U.S. Universities	
Management (University of Pittsburgh)	3
Management (Texas Technical)	1
IITA	
Maize Research and Production	5
Cowpea/Soybean Research and Production	14
Root and Tuber Crop Reearch and Production	4
Maize Pathology	4
Entomology/Biocontrol	5
Seed technology	3
Weed control	2
Alley cropping	4
Tissue culture	2
Physical Plant Services	1
CIAT (Columbia)	
Bean Breeding	3
Bean Agronomy	1
Bean Pathology	1
CIAT (Rwanda)	
Bean Agronomy	3
FSR 1	
Grain Legume Research and Production	7

No participants have been sent to CIMMYT because training in maize research/production at IITA is more appropriate for Agrican conditions and because instructions is not given in French at CIMMYT. No participants have been sent to ICRISAT because of the language constraint.

(5) Long term degree training. The Cooperative Agreement (Benchmarks) called for nomination of 10 candidates in third quarter, 1985 and 10- more in first quarter, 1986.

As it actually occurred, 12 candidates had been selected before the Cooperative Agreement was signed. The training Advisory Committed (which included, from the IITA team, the C.O.P., Training Officer and Principal Advisors) met in January 1987 and nominated another eleven candidates and then in Agusut 1987, twelve more. This filled all long term training slots.

It was not possible to fill slots earlier because it was necessary to recruit new staff for these positions and it was considered necessary that a prospective candidate hav at least one year experience in the Project before being considered for nomination.

(6) Preparation of work plans. work plans for each IITA team member were submitted for the agricultural year 1 October - 30 September for 1985/86, 1986/87, 1987/88 and 1988/89.

(7) Submission of Quarterly Reports. Quarterly reports have been submitted for all quarters, fourth quarter, 1985 to second quarter 1988. The format has evolved over time and we believe the change in format with the most recent report renders it an improved vehicle for communication.

ANNEX 29

8 December, 1988

IITA Proposed Benchmarks for Period of Extension of IITA/USAID Cooperative Agreement to Setpember 30, 1990

Third Quarter, 1988

- 12 MSc candidates complete English training at ZALI
- 2 participants complete MSc studies in Agronomy: PNM (1) and PNL (1)
- Annual review and planning meeting
- Selection of sites and participants for 88/89 OFR trials
- Begin collecting feedback from farmers on Alley-cropping, Kasai-oriental
- Begin assessment of oxtraction in Alley-cropping, Kasai-Oriental

Fourth Quarter, 1988

- 12 MSc candidates depart for U.S. (ALIGU) for final preparation in English and university placement
- 2 participants complete graduate studies: 1 PhD, rural scoiology; PNM and 1 MSc, agronomy, PNL
- Installation of computers at M'vuzai, Lubumbashi, Gandjika and Kinshasa
- CPF operating budget for 1989 prepared
- Development of hybridization program for all four grain legume crops in greenhouse at Gandjika
- Initial seed increase of groundnut variety JL24 identified as promising at Kiyaka and Kaniama
- Distribution of 10-20 maize variety extension trials in southern Shaba and 5-10 at each other PNM station
- Propose release of maize variety for southern Shaba region
- Continued on-farm testing of improved varieties of maize (Lubumbashi, Gandjika), cassava (M'vuazi, Gandjika), soybeans (Gandjika) and of Alley cropping (Gandjika)

- Begin on-farm testing of lime application to groundnut in association with cassava (M'vuazi)
- Conduct second exploratory FSR survey in Kasai Oriental
- Presentation of papers by 3 IITA staff at FSR Symposium, University of Arkansas and 1 IITA staff at American Society of Agronomy meetings
- Prepare plans and cost estimates for station improvement work at Kiyaka and Gandjika (RAV executed)
- Begin A & E studies at Gandjika (Latinoconsult)
- Solicit bids for construction at Kaniameshi

First Quarter, 1989

- 12 MSc candidates placed in Universities
- 1 participant completes MSc degree: Agronomy, PNL
- Initial testing in farmers' fields of promising groundnut varieties
- Provide seed of two improved soybean varieties to BUNASEM
- Socio-economic survey of PNM FSR pilot area
- Survey of impact of cassava variety F100 in Bandundu region
- Purchase/transport materials for station improvement work at Kiyaka and Gandjika (RAV executed)
- Complete A & E studies for Gandjika (Latinoconsult)
- Select contractor for construction work at Kaniameshi

Second Quarter, 1989

- 1 participant completes MSc training: pathology, PNM
- Third FSR exploratory survey, Bas Zaire
- Complete Kinuani and local cassava variety survey in Cataracts sub-region, Bas Zaire
- Yield increases due to alley-cropping demonstrated in farmers' fields

- RAV FSR workshop, Lubumbashi

- Erect greenhouses at Lubumbashi for leaf-hopper rearing

- Begin station improvement work at Kiyaka and Gandjika (RAV executed)

- Solicit bids for construction at Gandjika

- Begin construction at Kaniameshi

- Begin construction of two houses at M'vuazi

Third Quarter, 1989

- Annual review and planning meeting

- Release of maize varieties for main season for Bas Zaire, Bandundu, Kasai-Oriental and southern Shaba and for second season for Kasai-Oriental and southern Shaba

- Complete report on maize-based cropping systems in southern Shaba

- Prepare brochure on recommendations for farmers on maize cultural practices

- Selection of sites and participants for 89/90 OFR trials

- Select contractor for construction at Gandjika

Fourth Quarter, 1989

- 4 participants complete MSc training: Agronomy, PNL; pathology, PNM; breeding, PNL (2)

- CPF operating budget for 1990 prepared

- Distribute 10-20 maize variety extension trials in southern Shaba and 5-10 at each other PNM station

- Conduct third exploratory FSR survey in Kasai-Oriental

- Begin on-farm trials at third site in Bas Zaire (Songololo)

- Analysis and write-up of FSR weekly survey data from Kasangulu Zone and M'vuazi zrea

- Complete rehabilitation of housing, water system, electrical system, garage/workshop at Kiyaka
- Contractor begins work at Gandjika
- Begin construction of two more houses at M'vuazi

First Quarter, 1990

- 1 participant completes PhD training: entomology, PNM
- Analysis and write-up of market price data, Bas Zaire and Kinshasa (FSR)
- Installation of soil testing laboratory at M'vuazi

Second Quarter, 1990

- 3 participants complete MSc training: breeding, PRONAM; Agronomy, PRONAM (2)
- Improved local cassava variety survey in Bas-Fleuve sub-region, Bas Zaire
- RAV FSR workshop, Gandjika
- Complete rehabilitation work (RAV executed) at Gandjika
- Complete construction of first two houses at M'vuazi

Third Quarter, 1990

- 2 participants complete PhD training: pathology (PRONAM), entomology (PNL)
- Annual review and planning meeting
- Assessment of alley cropping as a technology for small farmers in Kasai Oriental
- Selection of sites and participants for 90/91 OFR trials
- Complete construction of training center at Kiyaka
- Preparation of final reports

ANNEX 30 - TRAINING

CANDIDATES FOR DEGREE PROGRAMS IN THE U. S.

PROCESS FOR NOMINATION, SELECTION, AND LIAISON WITH USAID, USDA

1. A policy for participant nomination and selection has been developed by the project. (Sample 1 English and French)

2. A candidate must be nominated by a member of the Training Advisory Committee (Membership: Coordinator; Adjoint; Chief-of-Party; Project Officer, USAID; Director of Training, RAV; Directors of PRONAM, PNL and PNM; and when possible, advisors to each Director.)

3. When the Director of Training receives a nomination, he can contact the candidate , and ask for specific information to complete the candidate's credentials. For presentation to the selection committee, the first six requirements for documentation (Sample 2) must be in the folder for the committee to have adequate information to make a decision.

   It is easy to send a copy of the list with the items past no. 6 marked off, and tell the candidates that the first 6 items are needed at this time.

   Some candidates have copies of their transcripts, and some do not. It is customary to send someone from the RAV staff to the university to get the official transcripts.

4. The Director of Training arranges the meeting of the training committee to make the selections. The positions for which the selections are made are designated by the Project Paper, or in some cases, possibly amendments to the Project Paper.

   The Director of Training develops the agenda for the meeting, and arranges for the members to have an opportunity to review the credentials of the candidates in advance. However, in conduct of the meeting, though the Director of Training can and should guide the meeting, and present candidates, the culture will probably not allow him/her to serve as chairman of the meeting. This will probably be done by the Coordinator of the Project. (A sample agenda and handouts for a meeting of the committee is included in Sample 3.)

5. When a candidate is selected by the Committee, then the Director of Training must work closely with USAID and the USDA liaison in the U. S. for sending the candidate to the U. S.

   A. First, all of the documents required by the U. S. universities (items 1-6 on the list, Sample 2) must be sent to the USDA liaison in Washington, D. C.

   B. Second, a completed medical exam form must be furnished to USAID for each candidate prior to their departure. (Sample 4.)

   C. If USDA requires TOEFL or GRE scores before giving a call forward, arrangements for these tests must be made here. The USAID Mission here has preferred to send the candidates to the U. S. for language training, but we have administered

an institutional TOEFL through ZALI to provide an indication of language level. Work closely with USAID to make decisions on this.

D. A PIO/P must be developed for each candidate by USAID. The Director of Training must supply USAID with the information to do this. (Sample 5 is a model PIO/P form developed in RAV to provide the necessary information for the PIO/P.

E. When the PIO/P for each candidate is developed, RAV can begin the procedures for securing travel orders for each participant, notes verbales, and passports. Six photos of each candidate will be required. A copy of the PIO/P for each person will be required for arranging orders.

F. When an official call forward is received from USDA, the Training Officer for USAID will make plane reservations, buy tickets, and request travel money for each person. This must be done several weeks in advance, since the checks must come from France to Zaire.

G. The participants must be alerted as far in advance as possible, of their departure date, so that they may make arrangements for their families while they are gone.

H. When time draws near, messages must be sent calling the participants to Kinshasa for departure.

I. Before departure, each participant must sign a form (Conditions of Training Sample 6 French and English) which USAID requires for their files. The forms are in the posession of USAID and the representative of USAID must sign them also. The signing gives the participant an opportunity to ask questions of the USAID project Officer as well.

J. Visa arrangements: The USAID Training Officer will prepare visa application forms for each participant but the Director of Training, RAV, must make sure this is done, and take the individuals to the American Consulate for the visas. A photo of the individual will be required for the visa.

K. The RAV logistics section will procure laisser-passers for each participant shortly before departure, and RAV should provide transportation and expediter services for participants at departure.

L. A telex must be sent to the USDA liaison informing the liaison of the time and flight of arrival in Washington, D. C. Normally this is done by USAID, but the Director of Training RAV must be sure that it is carried out.

M. The policy developed jointly by RAV and USAID for research on Masters and Ph D degrees is sample 7.

PARTICIPANT TRAINEES STATUS

NO.	NAME	PIO/P No.	UNIVERSITY	DISCIPLINE	EST. COMPL. DAT
1	Bambele Likoko	70068	Not placed	Ag. Soils	N/A
2	Eyensiye Mbo	70069	-"-	Ag. Eng	N/A
3	Kalala Muamba	70011	-"-	Ag. FSR.	N/A
4	Kanyand Matand	70060	-"-	Breeding	N/A
5	Lukabi Zantoko	70059	-"-	Entomology	N/A
6	Mbungu Naitu	70067	-"- M.Sc.	Entomology	N/A
7	Mergo Mbeya	70066	-"- M.Sc.	Ag. Crops	N/A
8	Nkozongo Kabeya	70065	-"- M.Sc.	Ag. Econ.	N/A
9	Nsinqisa Lukombo	70062	-"-	Food Tech.	N/A
10	Tamubolo Mafolo	70070	-"-	Breeding	N/A
11	Tshileo Mbuyi	70064	-"- M.Sc.	Extension	N/A
12	Tshiyombo Mwamba	70063	-"-	Ag. Soils	N/A
	PHD				
13	Asanzi	40072	Ohio State Univ.	Entomology	5/90
14	Bakelana	60022	Ohio State Univ.	Agr. (Crops)	6/91
15	Bonani	30079	Univ. of Wisc.	Rural Soc.	12/88
16	Kasele	40073	Colo. State. Univ.	Agron. (Physiol.)	4/90
17	Kasu	40120	University of Ken.	Entomology	5/90
18	Kiala	40171	Cornell University	Breeding	6/91
19	Muimba	40075	Cornell University	Path.	5/90
20	Muyolo	60067	Ohio State Univ.	Path.	6/91
21	Toko	60071	Purdue University	Entomology	6/91
—	MATUNGULU KANDE		N. CAROLINA STATE U.	Soil science	
	MSC				
22	Bidiaka	60072	Georgetown	Breeding	6/9
23	Elukesu	30077	Colo. State Univ.	Agron. (Crops)	12/88
24	Kadima	40174	Texas A&M Univ.	Breeding	6/90
25	Kassongo	60023	Ohio State Univ.	Path.	6/90
26	Koko	30075	Univ. of Florida	Agron. (Soils)	9/88 ✓
27	Landu	40173	Georgetown	Agron. (Crops)	6/90
28	Mbulu	60070	Georgetown	Agron. (FSR)	6/90
29	Mpunga	40094	did not receive Deg.	Ag. Econ.	10/87
30	Munungayi	30076	Univ. of Florida	Agron. (Crops)	09/88
31	Mutimura	40102	Colo. State Univ.	Ag. Econ.	08/87
32	M'Vita	60066	Tuskeegee Univ.	Breeding	06/90
33	Ngoyi	60069	Tuskeegee Univ.	Agron. (Soils)	06/90
34	Tubajika	40071	Iowa State Univ.	Path.	06/89
35	Useni	40074	Univ. of Florida	Agron. (FSR)	12/88

RAV Long Term U.S. Training Discipline Distribution — March, 1988

No. of Participants	Discipline
6	Breeding
5	Entomology
5	Crops
4	Soils
4	Pathology
3	FSR
3	Ag. Econ.
1	Ag. Eng.
1	Food Technology
1	Physiology
1	Extension
1	Rural Sociology
35	

TRAINEES

Who went through Tropical Root Crops Research and Production, Tissue Culture and Rapid Multiplication Training Courses at IITA

- ZAÏRE -

Root and Tuber Improvement Program
International Institute of Tropical Agriculture (IITA)

Z A I R E

ANOTA, Tomu * M.Phil (Left PRONAM)
Ingenieur Agronome
Bunasem
Kinshasa
ZAIRE. (1977)

BELAWAKU, Va-Kanda *
Pronam, M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1984)

BIKOKO, Nwanyebeka Kongoliko * (Left PRONAM)
Ingenieur Agronome
Assistant de Recherches
Avenue Kapanga No. 22
Zone de Kinshasa
Kinshasa 1
ZAIRE. (1979)

BIANU, Landu-Kalemba * MSc.
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1978)

DELO, Ndombo * MSc.
Pronam
B.P. 11635
Kinshasa 1
ZAIRE. (1982)

GAMAKOLO, Nkiere Bariki * (Left PRONAM)
Ingenieur Agronome
Assistant de Recherches
B.P. 20. 394
Kinshasa - 21
Rep. du ZAIRE. (1979)

GILUMBU, Muyolo * M.Phil (PhD course in US)
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1978)

IDUMBO, Nsongi Kasele * M.Phil (PhD course at Colorado State Univ.)
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1978)

IFEFO, Baka-Baembe * MSc. (Left PRONAM)
Ingenieur Technicien
ZAIRE. (1977)

KAMIZELO, Kitambala
PRONAM/R.A.N.
BP 11635
Kinshasa 1
ZAIRE. (1987)

KANDE, B. (left PRONAM)
Former Directoe INERA
M'Vuazi
ZAIRE. (1973)

KAPONGU, Lukanda *
Pronam M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1983)

KAKALA, Mozengo *
PRONAM Kiyaka
B.P. 196
Kikwit
ZAIRE. (1983)

KIALA-Kilusi-N'gudi-Wa-Se * M.Phil (PhD course in US)
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1978)

KWANZA, Bolamba *
Agronome
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1977)

LUBILANJA, Kabengele *
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1981)

LUFELE, Mautcny ?
B.P. 12085
Kinshasa 1
ZAIRE. (1976)

LUTALADIO, ne Bambi * Ph.D
Assistant Coordinator
RAV
B.P. 11635
Kinshasa
ZAIRE. (1977)

LUTETE, Diankenda
PRONAM/M'VUAZI - RAV
BP 11635
Kinshasa
ZAIRE. (1987)

MAHUAGU, Nzola-Meso* Ph.D
Director
PRONAM M'Vuazi
BP 11663b
Kinshasa
ZAIRE. (1978)

MBAMBO, Nkumu *
Pronam
B.P. 11635
Kinshasa 1
ZAIRE. (1984)

MBENGA, Ngambua *
Pronam, Gandajika
B.P. 220
Gandajika, Kasai - OR.
ZAIRE. (1984)

MBOYO, Bangili
B.P.I. 067
ECZ
Epwateur
ZAIRE
OR
c/o BATOY, Lokwa
B.P. Avenue Bralima 11 No. 37
Mbandaka
ZAIRE. (1983)

MBULU-Ntoto-Matundu * MSc.
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1980)

MBUYI-Kanyemesha *
Pronam, M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1985)

MBUVAMBA, Ntumba * (Left PRONAM)
Ingenieur Technicien Agronome
ZAIRE. (1977)

MBUYI, Tshikaya * (Left PRONAM)
ZAIRE. (1978)

MPUNGU, Tuabanya Biselele (Rapid Multiplication of Root Crops)
PRONAM
B.P. 237
Gandajika
ZAIRE. (1987)

MUTOMBO, Tshibadi *
Ingenieur Technicien Agronome
Assistant de Recherche
B.P. 196
Kikwit
Rep. Du ZAIRE. (1980)

M'VENGO, Mayimona *
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1984)

MUIMBA-Kankolongo, A. * M.Phil (PhD course at Cornell)
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1978)

MUAKA-Toko * M.Phil (PhD course in US)
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1978)

NDAYI, Kilumba * MSc.
Directeur
PNL Gandajika
B.P. 220
Gandajika, Kasai - OR
ZAIRE. (1976)

NLUTA, SOLOMONI (Tissue Culture)
PRONAM M'Vuazi
B.P. 11635
Kinshasa I
ZAIRE. (1986)

NTITA, Kabya ?
PRONAM
B.P. 11635
Kinshasa 1
ZAIRE. (1985)

NSIBANDOKI, Lukikeba *
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1984)

NSAZUKIDI, Kisosuanga *
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1976)

NSIAMA, She H.D. * Ph.D
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1978)

PHUTI, K. (Tissue Culture)
PRONAM
B.P. 11635
Kinshasa 1
ZAIRE. (1984)

PULULU, Zinkoka *
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1983)

PHUTI, Kukuela *
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1977)

SEBASIGARI, Kabonyi * Ms
IRAZ
B.P. 91
Gitego, Burundi
ZAIRE. (1973)

SESETE, Mwitho V. - Wabo-Paluku
Tresoriere du Cederu - Animation
et Vulgarisation
E.C.Z./CEDERU
B.P. 70
Rurshuru/Kivu
Republique du ZAIRE. (1980)

SIMBA, Lianabo *
PRONAM M'Vuazi
B.P. 11635
Kinshasa
ZAIRE. (1977)

TSHIBAMBA, Mulumba-Wa-Bana
PRONAM/R.A.V.
B.P. 11635
Kinshasa 1
ZAIRE. (1987)

TUBANZA, Situtala *
PRONAM, M'Vuaza
B.P. 11635
Kinshasa 1
ZAIRE. (1985)

TUNGADIO, Kiangeseni *
PRONAM M'Vuazi
B.P. 11635
Kinshasa 1
ZAIRE. (1983)

TOMBO, Kasu * MSc (PhD course at Kansas State Univ.)
Pronam-Zaire
B.P. 11635
Kinshasa 1
ZAIRE. (1982)

NETWORKING

PRONAM takes part in CEWARRN (Central and West African Roots and Tubers Research Network) which is operated by IITA.

PNM is not part of any collaborative research network on maize operating in Sub-Saharan Africa. There is the SAFGRAD network on maize, funded by USAID, which focuses on adaptive research in semi-arid areas. There is also the recently created CORAF network for maize (coordinator Dr. Ayuk Takem of IRA, Cameroon) which encompasses about twenty countries and which focuses on applied maize research, principally in francophone countries. There is also a research network on maize for southern Africa with SACCAR and with CIMMYT involvement. From an ecological perspective, PNM has most affinity with the southern African research network.

PNL is also part of a collaborative research network with CIAT in IRAZ that includes Rwanda and Burundi. They would also have an interest in joining the CORAF network on groundnuts.

LINKAGES WITH ZAIREAN UNIVERSITIES AND RESEARCH INSTITUTES

None of the three programs has strong linkages with the university system. The only faculty of agriculture in Zaire is situated at Yangambi, 100km west of Kisangani, in the north of the country. Its faraway location from any of the three major research station of RAV makes relations nearly inexistant.

PNM has mail correspondance with CREN-Kinshasa and tests maize varieties which have been irradiated by this institution. Some of these varieties are promising. PNM has soil's analyses carried out by CRAA at Lubumbashi and a joint research proposal with the FSR-section of PNM concerning agricultural production constraints has been submitted to the Rockefeller Foundation.

In general, it is believed that one of the major disadvantages of having agricultural research located at the DOA is difficulty of interaction with the universities. On the other hand, linkage with extension is all the more easy as extension is always located in the DOA. In the case of Zaire, if RAV was located in INERA, an autonomous organization, it would not make relations with the universities any easier. As long as the agricultural faculty is located at Yangambi, it will just be impossible to relate to and interact with it. A team from EMBRAPA, Brazil's agricultural research organization, visited Yangambi last week. It took them 12 hours by road to cover the 100km which separates Yangambi from Kisangani (source: ELIMA, a national newspaper).

PROGRAMME DE RECHERCHE MANIOC - INERA

INTRODUCTION

Le manioc est l'une des cultures vivrières les plus importantes du Zaïre. Son importance est plus marquante quand on réalise que le Zaïre en est le premier grand producteur en Afrique et troisième grand producteur mondial. Il est cultivé sur environ 50 % des terres arables du pays et ses racines fournissent environ 40 % des besoins calorifiques des 70 % de la population rurale. Les feuilles de manioc consommées sous forme de "Pondu" constituent le légume le plus populaire du pays et sont une bonne source de protéines végétales.

Quoique grand producteur, le rendement du manioc au Zaïre est encore très faible (environ 7 tonnes/ha) comparé à des potentialités de production telle qu'obtenue au Colombie (33 tonnes/ha). Cette faible production est due à plusieurs facteurs dont les maladies et les pestes qui attaquent la culture, la faible variabilité génétique du matériel local utilisé, la mauvaise fertilité de la majorité des sols utilisés et le système d'exploitation extensif à faibles intrants. Le tableau 1 en annexe donne la situation de superficies et de la production de cette denrée de 1970 à 1985.

ACQUIS DE LA RECHERCHE

Le Programme National Manioc a développé un lot de variétés ayant une potentialité de rendement élevé et qui sont tolérantes aux diverses maladies. Il s'agit de :

- Kinuani (20-25 T/ha), diffusé dans l Sud-Zaïre
- F100 (15-20 T/ha), diffusé dans le Bandundu
- Clone 70453, résistant à bactériose du manioc (mal identifié au Kasaï, autres clones à haut rendement et résistants aux maladies, à l'essarien vert ont été identifiés au Shaba, Kasaï et Kivu.

Le Programme National Manioc (PRONAM) a son siège principal à M'vuazi (Bas-Zaïre) et dispose de stations expérimentales (Kiyaka-Mulungu-Gandajika-Kaniama) et de sites d'adaptation (Gimbi - Kimpese - Kisantu - Katana etc...) à travers le pays.

A. Sous-Programme : Amélioration Génétique et Sélection.

1. Ressources génétiques

Opération 1a : Ressources génétiques locales.
- identification des variétés locales pour servir à l'amélioration
- introduction IITA

Opération 2a : Révision des critères de sélection.
- recherche de variétés stables, à haut rendement, résistant aux principales maladies et ravageurs, à maturité précoce, durables, dont les produits de consommation sont acceptables aux consommateurs (goût, temps

teneur en HCN sur le végétal en produit transformés.

II. Sélection - Amélioration

Opération 3a : - Application du schéma de sélection (cfr. Station M'vuazi)
- an 1 criblage de la pépinière à graines 40.000 à 100.000 graines (P.G)
- an 2, essai clonal sur les obtentions de la pépinière à graine présentant les critères de sélection ci-dessus (FC) 1.000 à 2.000 clones.
- an 3, essai préliminaire de rendement 150 à 200 clones (3 sites)
- an 4, essai avancé de rendement 30 à 90 clones
- an 5, essai uniforme de rendement 10 à 30 clones (5 sites)
- an 6 et 7, essais multi-locaux 5 à 10 clones (6 sites)
- an 8, multiplication et diffusion.

Opération 4a : Filières spécifiques pour le Manioc à pulpe jaune présentant une teneur élevée en vitamine A et en calcium, et une faible teneur en Acide Cyanhydrique HCN.
- Essai clonal, Essai préliminaire de rendement.

III. Caractères spécifiques croisements Inst Sélection

Opération 5a : Evaluation de la précocité des clones en vue de sélection (les racines de certaines variétés précoces pourrissent au 14 mois. Les variétés locales souvent tardives ne pourrissent pas).

Opération 6a : Evaluation des rendements préliminaires en feuilles (vondu).

Opération 7b : Blocs de croisements.
Pollinisations contrôlées et libres sur clones sélectionnés.
Obtention de graines pour pépinières (FC) oper. 3a.

Opération 8a : Essai des clones A elite dans les principales régions de culture actuellement. 5 clones tests 30065/28, F100, 30230/3, 30864, 30572, 4-2-1270.

IV. Essais spécifiques d'amélioration.

Opération 9b : Essais spécifiques d'amélioration à conduire à la station principale d'Yangambi
- Etude de la potentialité d'accumulation (sink capacity) et d'activité photosynthétique (source potentielle) des clones élites (12 élites) clone testeur : port greffe accumulation.

Opération 10b: Amélioration intra-population (extrait de base Composite A, matériel de création (117-280-44)

action 5b : Effet des variations climatiques et de l'époque de plantation du Manioc sur le niveau des principales maladies. Dynamique de population des insectes vecteurs de Pseudomonas [illegible] Xanthomonas/Bacilles. Méthodes.

action 6a : Incidence et sévérité des maladies du manioc dans les variétés améliorées dans [illegible] système de culture mono et multivariétale (en milieu traditionnel). Reaction des variétés aux différentes.

action 7b : Effet de récolte de feuilles (Phase I sur l'interaction entre la partie aérienne, la morphologie et le rendement en feuilles comestibles et en tubercules frais.
L'étêtage accentue la ramification, qui entraîne une plus forte expression de la base vivrière.

action 8a : Effet de l'importance cylindrique sur la pourriture des tubercules et le rendement.

action 9b : Influence des variables agronomiques (sur la sévérité des maladies du Manioc.
sites : Bimbi/Mosaïque, Kiyaka/Bactériose - Anthracnose et M'vuazi/Les 3 maladies.

action 10a : Influence des sols (des profondeurs, sols ferrallitiques, sols sableux) sur l'importance de la sévérité des trois maladies : M. E. A.

action 11b : Evaluation des pertes de rendement en tubercules et en matière sèche dues à l'infection mixte Bactériose + Anthracnose.

action 12b : Etude de la mise au point des associations" culture mono et multivariétale effets du type de labour et du temps de [illegible].

action 13b : Evaluation de la résistance des variétés sélectionnées à l'Anthracnose.
In vitro en chambre humide [illegible] par P. dévastans et par pulvérisation de suspensions.

2. Entomologie

Opération 1 : Lutte biologique contre la cochenille du Manioc CM et l'acarien vert du manioc.

action 1a : Epidémiologie de [illegible] régulation de population, facteurs responsables.

action 2b : Efficacité du parasite, Epidinocarsis [illegible] rapport

action 3b : Rapport entre les fourmis et l'activité de E. lopezi pour la lutte biologique contre la cochenille du Manioc.

Opération 2 : Résistance de la plante hôte Manioc.

action 1a : Evaluation pour infestation artificielle en serre des clones de Manioc en vue de leur utilisation pour la résistance à la cochenille et à l'acarien.

action 2b : Plants hôtes d'hybridation de Pseudomonas syringae devenons hospitalo-universitaire [illegible] Unikongo du Bas-Fleuve.

Opération 3 :

action 1a : Evaluation des cultivars du complexe du Manioc sous infestations par la cochenille et l'Acarien vert. Infestation artificielle des champs.

action 2b : Inventaire des producteurs du Manioc à la plantation au stockage des produits.

C. Sous-Programme Système de Production Agricole (PSP)

Opération 1a : Cultures associées Manioc/arachides. Manioc/Pois cajan. Sites Mvuazi et Kisantu (Bas-Z.).

Opération 2a : Cultures en couloir, évaluation des espèces d'arbustes utilisables. Sites Kimpese, Kisantu (Bas-Zaire). Glirisidia sp. Leucaena.

Opération 3a : Effet des techniques culturales sur quelques clones prometteurs de manioc en condition d'association culturale, sur différents niveaux de fertilité.

Opération 4a : Fertilisation du Manioc dose et date d'application du potassium. Interaction chaux/phosphore sur sols acides à toxicité Al.
Chaulage en cultures associées Manioc/Arachide.

Opération 5a : Conservation des boutures en milieu ripisylve.

Opération 6a : Enquêtes socio-économiques et tests variétaux Manioc gérés par les paysans. Arachide + chaulage gérés par les paysans. Enquête - Diffusion des variétés Manioc (F100, 025&4, Kiwanu).

Parcelles de démonstration et de multiplication des variétés améliorées de manière à les paysans.
Collaboration avec les agences publiques et privées effectuant le développement agricole.

Evolution de la production et des superficies cultivées de manioc (1979 à 1985) respectivement en milliers de tonnes de racines et 1.000 Ha.

ANNEE	1979	1980	1981	1982	1983	1984	1985
Production	12.566,5	13.087,2	13.172,0	14.104,5	14.[illegible],6	15.037,5	15.[illegible],1
Superficie	1.795,2	1.869,6	1.923,6	1.979,3	2.038,1	2.[illegible]2,8	2.14[illegible],7

Source : Annuaire des statistiques agricoles 1979 - 1985.

ANNEX 33

INERA
INSTITUT NATIONAL POUR L'ETUDE ET LA RECHERCHE AGRONOMIQUES AU ZAIRE
* * *

PROGRAMME DE RECHERCHE MAIS

I. DESCRIPTION GENERALE DE LA CULTURE DU MAIS AU ZAIRE

1.1. SITUATION GENERALE

Ce produit de base dont tout ou [illegible] explications, selon les régions [illegible] main. Généralement le maïs est cultivé [illegible] les arachides, le coton, le manioc et [illegible] peuplement est très faible et l'[illegible] d'engrais était limitée aux [illegible] moyens sont faibles. En 1985, la [illegible] production du maïs se présentait de la manière suivante :

Kinshasa	1,2 %
Bas-Zaire	7,6 %
Bandundu	15,2 %
Equateur	15,1 %
Haut-Zaire	14,2 %
N.K.	13,0 %
Shaba	13,0 %
Kasaï-Occ.	11,6 %
Kasaï-Or.	11,1 %

Le tableau ci-dessous présente l'[illegible] superficies cultivées et de la production de 1979 à 1985.

Tableau 1. Evolution des superficies et [illegible]

	1979	1980	1981	1982	1983	1984	1985
Superficies (x1000 Ha)	732.0	734.0	781.0	785.0	[illegible]	821.0	830
Production (x 1000 T)	582.1	594.4	651.7	656.3	[illegible]	717.5	724.1
Importation (x 1000 T)	150.0	103.0	103.0	30.0	[illegible]	0.0	50.0

Source : Département de l'Agriculture, Service des [illegible] cahier 1979-1985.

L'examen de ces données montre [illegible] pas encore satisfaisant en dépit [illegible] Haut-Zaire qui la pratique [illegible] partielle dans les régions minières et [illegible] pratiquée depuis 1950.

Plusieurs raisons peuvent expliquer cette situation :

- l'utilisation des semences [illegible] ;
- la pratique des méthodes culturales [illegible] ;
- le manque d'intrants (outillage, [illegible] ;
- l'incidence des maladies (surtout la [illegible] ;
- l'état défectueux des routes [illegible] ;
- faiblesse de l'encadrement.

Réalisant [illegible] consommation, le Conseil [illegible] l'importation [illegible]

CIMMYT, lancé en 1971 [illegible] d'améliorer la production du maïs grâce à la mise [illegible] nouvelles variétés et des techniques adaptées aux [illegible]. Signalons qu'avant la création du Programme National [illegible], deux variétés synthétiques mises au point par l'INERA, [illegible] l'Ubangi les seules variétés améliorées [illegible] du Kasaï et du Shaba.

Les besoins théoriques de maïs par région et par [illegible] sont consignés dans le tableau 2.

Tableau 2. Besoins théoriques de maïs par région et [illegible] 1985 à 1990.
(X 1.000 Tonnes)

	KIN	BZ	BOD	EQ.	W-E	K.OR.	K.OC.	SH
1985	54	14	29	50	67	[illegible]	150	[illegible]
1986	55	15	30	51	67	130	154	41
1987	56	15	31	52	69	133	157	42
1988	57	16	32	53	71	136	161	43
1989	58	16	33	54	73	139	165	44
1990	59	16	34	55	75	142	169	45

Source : situation actuelle de l'agriculture [illegible]
Département de l'Agriculture - S.E.P. - 1987.

Il ressort de ces données que le Shaba suivi du Kasaï Occidental et du Kasaï Oriental sont les plus [illegible]. Dans cette triade régions, le maïs est considéré comme [illegible] de base. Il ne vient pas moins que dans d'autres régions, le maïs [illegible] intervient dans la fabrication de plusieurs types de boissons locales.

Outre la consommation humaine, le maïs intervient dans la préparation des aliments pour bétail sous forme de grain ou mélangé avec d'autres produits brumatologiques au sein [illegible] d'élevage. Les industries brassicoles du pays utilisent également des quantités de maïs non moins négligeables.

1.3. CARACTERISTIQUES AGRONOMIQUES DE LA CULTURE DU MAIS

- Au SHABA, il existe plusieurs projets d'encadrement qui donnent priorité à l'expansion de la culture du maïs, nous citons le Projet Nord Shaba, le Projet Lubudi, le Projet Kolwezi, le Projet Kamina-Kasenga. Il y a également des [illegible] Développement, le CEPC, CEATA qui [illegible] les fermiers. parallèlement à ces [illegible] organisent leurs fidèles pour le [illegible]. C'est le cas de "SHALOM" (Shaba la [illegible] Shaba Community, organisme d'obédience catholique qui opère dans [illegible] Lubudi. Les sociétés industrielles s'intéressent [illegible] à l'agriculture et le maïs se retrouve [illegible] cultures privilégiées. C'est le cas de la SOMIMIZA, [illegible]. Les employés de ces sociétés sont [illegible]

l'assistance technique et matérielle de la FAO (Centre ... Moyennes Entreprises Agricoles). Les activités de recherche sur le maïs dans cette région sont menées par la SNV dans la province du Kwilu-Ngongo et du Kwango. La démarrage du projet ... Kivu-Maniema (P.H.M.K) permettra la réhabilitation ... différents projets et ONG sur l'axe Bukavu - Walungu.

- Au Kasaï Oriental, la mise en ... de la ... pa, Idaho et la culture du maïs ... Dans cette région ... le cadre du Projet PMKO veudra ... distribution des intrants, les recherches ... la recherche de l'INERA Gandajika pour le PRM.

- Au Kasaï Occidental, la culture ... dernière de Luiza. Deux projets du Département ... dans cette région. Il s'agit du projet PNSERM-KWILU ... Aucune activité de recherche sur ... les recommandations formulées ... de Gandajika et de certaines ... travers le PRODALU à Port-Francq et à Tshikapa.

- A Bandundu, la zone est ... pour ... raisons commerciales. En effet, cette région ... essentiel pour la ville de Kinshasa, ... activités de recherche se déroulent à ... Mvuazi.

- Au Bas-Zaïre, la zone n'est pas ... la situation géographique, à proximité ... Kinshasa, ... cultivé dans cette région pendant ... d'autre part d'année en année, cette région ... augmentant, ne serait ce que pour ... pintades ... maïs. Il faut y ajouter ... grains négligeables qu'il convient ... bromatologique et le maïs y trouve un ...

La station INERA-M'vuazi abrite ... maïs.

- A l'Equateur, bien que ... base des habitants, cette région ... Zaïre doit jouer un rôle ... ville de Kinshasa en ... Bandundu. Les travaux de ... station de Bokata.

- Au Haut-Zaïre, la zone ... dans la sous-région ... mais s'affectuaient à l'INERA Yangambi, à Bukavu et à ...

- Au Kivu, on enregistre un ... alimentaires en faveur ... dans cette région qu'il y a ...

Dans le Nord Kivu, en fleur de Bunia Nord, la recherche a été axée sur l'étude effectuée à la station de Mulungu.

1.3. CONTRAINTES AGRONOMIQUES A LA PRODUCTION

- dégénérescence des semences
- techniques culturales non appropriées
- incidence des maladies, surtout la [illegible] et la mosaïque

1.4. ACQUIS DE LA RECHERCHE DISPONIBLES

En plus des variétés OPV4 et OPV5 mises au point par l'INERA à la station de Gandajika, 4 variétés d'origine locale mises au point par le PNM sont disponibles.
Il s'agit de :

- DIABA 1	avec un rendement potentiel de	5 à 6 T/Ha
- SALONGO 2	-"- -"-	4 à 5 T/Ha
- KASAI 1	-"- -"-	4 à 5 T/Ha
- BANDUNDU	-"- -"-	3 à 4 T/Ha

Source : rapport annuels du PNM.

1.5. TRAVAUX DE RECHERCHE

Stations :
- Kamanashi
- Kiyoka, M'vuazi
- Kamama.

A. Programme : Amélioration génétique

Opération 1a. Introduction du matériel étranger (CIMMYT, ITTA...)
Evaluation de ce matériel [illegible]
Maintien des lignées.

Opération 2a. Création de lignées pures [illegible] de comportement - Croisements [illegible] combinaison - héritabilité [illegible]
Maintenance des lignées par [illegible] dégénérescence.

Opération 3a. Essais internationaux [illegible], IVT, Early variety trial), Experiment [illegible], IPTT, Progeny testing), OMP (Open [illegible]), EMPV et LORV (Early et late [illegible], IVCA (Semi Milden Streack resistant) [illegible] exprimés par le programme [illegible] variétales sur la [illegible] collaboration avec les [illegible] coopération.

Opération 4a. Test national des variétés [illegible] variétales sur [illegible] variétales [illegible]

Opération 5a. Multiplication contrôle [illegible] par le PNM, [illegible]

Attention recue. ( )

5. Conséquences : Baisse des cultures et famines généralisées.

Création 1ab. Amélioration de la résistance à la verse, vitesse de croissance (Shaak) mise au point [illegible]. Création de nouvelles variétés de riz (Tchi, Tchi Yo) à grain blanc et T2GR(y) ou sont montrés [illegible]. Trop cal au shaakra [illegible].

Création 2ab. Elevage artificiel de crevettes [illegible] l'alimentation contrôlée du maïs et [illegible] nières.

Création 3ab. Amélioration [illegible] par [illegible] Ferme [illegible] Ecole Tchi (CNRA - CPI) [illegible] Thailande (Les [illegible].

Création 4ab. Observations [illegible] Maïs (voir [illegible] Rouille, Cavia [illegible] var gris, les [illegible] Cavia [illegible] Elaboration [illegible] carotte.

6. Environnement : Accroissement [illegible]

Création 1ab. Elevage [illegible] Saint [illegible]

Création 2a. - [illegible] Nuits sont [illegible] tion [illegible] [illegible] Sans [illegible] de nuit. - Tous [illegible] avec la culture [illegible] - Cultures [illegible] [illegible]

Création 3ab. Fertilisation [illegible] Azote et phosphore [illegible] Engrais [illegible] Fertilisation [illegible] (SST.TST phosphate) Engrais [illegible] [illegible]

Création 4ab. Contrôle [illegible] Suivi [illegible] [illegible] Tsetse, [illegible] Agronomie, Biologie, [illegible]

Orientation 5b Physiologie végétale : [illegible]
Résistance à la sécheresse, station Polytechnique, de
Kamboinsé et de Kaya.

7. Sous-programme : Recherche-Développement

Orientation 1a. Collaboration avec les projets de développement pour
la diffusion des résultats de la recherche.
Programme National Engrais (PNE) : Burkina-Ghana-
Bas-Zaïre. Projet Lutte du Chaba (Suisse).
Centre de Développement rural intégré de Mwéka Kasaï
Occidental (CEDEFIM). Projet de Développement agri-
cole de la Lulua Kasaï Occidental : (PRODALUC).
Projet 102/USAID (Mwene Ditu - Mbuji Mayi) Kasaï Central.
Projet Travaux à Fungurume (Shaba Sud).
Projet Travaux à Fungurume (Shaba Sud).
CEDECO-Kinkonzi, Shaba Nord Kasaï.
- Tests de comportement de variétés en milieux
agriculteurs.

Orientation 2a. Fourniture de semences de base et de prototypes pour
multiplication. A.O.C. Kg
(1.120 Kg en 1987).

PROGRAMME DE RECHERCHE SUR LES LEGUMINEUSES A GRAINES

I. DESCRIPTION GENERALE

Les légumineuses communément appelée "viande de pauvre" constituent un moyen de lutte très économique contre la malnutrition manifeste par le Kwashiorkor et un améliorateur de la fertilité du sol.

Au Zaïre, les légumineuses couramment cultivées sont : le haricot commun (*phaseolus vulgaris*), l'arachide (*arachis hypogea*), le soja (*glycine max*), le niébé (*Vigna unguiculata*) le pois mascate (*Cajanus cajan*), le voandzou (*Vigna subterranea*) etc...

De toutes ces légumineuses, les trois premières ont été les plus étudiées. Cependant, ces dernières années, une importance accrue est accordée au niébé grâce entre autre à son adaptation tant en zones de savanes que dans la cuvette.

Les haricots : Ce vocable "haricot" englobe aussi bien le haricot commun que le niébé ou haricot Nkunu. Le premier est cultivé principalement dans les zones de hautes altitudes et le Kivu Zaïre et le second, plus plastique se trouve dans les deux Kasaï et s'infiltre ces dernier temps avec succès dans la cuvette.

Le soja : Malgré son introduction assez ancienne et sa valeur nutritive très élevée (35 - 40 % de protéines), la culture de soja connaît encore une faible expansion. Toutefois, grâce aux nombreuses recettes culinaires dont elle fait objet, la culture de soja apparaît comme un culture d'avenir pour le Zaïre.

L'arachide : L'arachide, très connue au Zaïre, est cultivée pour sa richesse aussi bien en glucides qu'en protéines. Elle est principalement exploitée dans les régions de savanes, autour de la grande forêt équatoriale. Elle entre normalement dans la rotation des cultures, le plus souvent sous forme de culture associée (maïs manioc ...).

Malgré leur nombre, leur importance, les légumineuses donnent une production insatisfaisante comme le montre le tableau 1. Quoique les données statistiques sur les bassins fassent défaut, il est reconnu que la demande de cette denrée sur les marchés urbains est toujours croissant. L'étude menée, à ce propos, par le Département de l'Agriculture, montrant l'infériorité du taux d'augmentation annuel de la production de légumineuses par rapport au taux d'accroissement annuel démographique a mis en évidence le déficit de la production de légumineuses.

II. CONTRAINTES A LA PROMOTION DES LEGUMINEUSES

Il est vrai que la production des légumineuses est déficitaire. Cependant, le nombre de légumineuses que pratiquent le Zaïre face cette faible production prouve à suffisance que cette spéculation connaît des difficultés. Ces dernières résident principalement dans :

- l'utilisation de semences dégénérées, vulnérables aux maladies et insectes nuisibles, au rendement réduit ;
- l'usage de méthodes culturales inadéquates.

- le manque d'un système d'encadrement des paysans et de vulgarisation de résultats de recherche;
- l'insuffisance de soutien logistique et financier à la recherche;
- le manque d'un système de commercialisation adéquat.

III. ACQUIS DE LA RECHERCHE

Les légumineuses avaient fait objet de recherche dans notre pays. Les résultats enregistrés dans ce domaine sont résumés dans le tableau 2.

IV. SOLUTIONS AUX CONTRAINTES

Dans le cadre de l'autosuffisance alimentaire, le programme national de recherche sur les légumineuses est créé pour apporter des éléments de solutions au déficit sur la production des légumineuses. Il est basé à Gandajika (Kasai-Oriental) avec antennes à Yangambi, Bambesa (Haut-Zaire), Mulungu (Kivu), M'vuazi (Bas-Zaire) et vise principalement :

- la création des variétés d'élites du point de vue du rendement, de la qualité de la graine, de la resistance aux maladies et insectes nuisibles; et dans le cas specifique du soja, des lignées ou variétés ayant une longue viabilité du pouvoir germinatif se conservant sans problème;
- la mise au point des pratiques culturales susceptibles de permettre aux meilleures variétés mises au point de mieux exterioriser leur potentialité génétique;
- la production de semences de pré-base.

Le programme comprend quatre sous-programmes comme detaillé sous-dessous.
Projet Belgo-Zaire station M'vuazi (Université de Gand)

A. Sous-programme Amélioration

Opération 1b. Ressources génétiques en liaison avec IITA
collections matériel existant et introduit.
Stations M'vuazi, Yangambi, Bambesa, Mulungu
(chambres-froides)
Haricot PNL. Mulungu, M'vuazi, (Yangambi).

Opération 2a. Apport et évaluation des lignées provenant du CIAT. Colombie, pepinières d'observation, de selection généalogique F2F5, d'adaptation

Opération 3a. Essais prémiminaires de rendement PNL
Essais avancés de rendement PNL
Essais spécifiques, resistance à la sécheresse et à la maladie de taile (Tanatephorus)
Vigna PNL, Yangambi, (M'vuazi).

Opération 4a. Maintion des lignées intéressantes et introduction des nouvelles lignées en provenance de l'IITA ...

Opération 5a. Hybridation : élaboration de croisements diallèles, heritabilité des caractères désirables. Selection généalogique des meilleures descendances (F2 à F6)

Opération 6a. Essais préliminaires, Essais avancés, Essais définit-

tifs de rendement. Essais multilocaux.

Opération 7a. Pepinières d'adaptation des lignées issues de l'ITA Gandajika, essais variétaux des lignées sélectionnées (Yangambi,Gandajika, Bambesa, M'vuazi)
Arachides PNL Yangambi, M'vuazi, Bambesa, Gandajika

Opération 8a. Collection, introduction de nouvelles variétés. Essais-Préliminaires EPR. Essais Avancés EAR. Essais Multilocaux EM.
Soja

Opération 9a. Yangambi, Mulungu, Gandajika, M'vuazi. Hybridation, croisements dialléle. Sélection généalogique des descendances (incorporation de la modulation libre, longevité des semences, résistance à la bacteriose, à la déhiscence). EPR. EAR. EM.

Légumineuses secondaires par mémoire. Pois carré. Cayans. Voandzou, collection , comportement.

B. Sous-Programme Défenses des Cultures

Phytopathologie

Opération :Cab PNL Yangambi, Sélection

Haricot : Résistance variétale à la maladie de toile Thanatiphorus. C. PNL M'vuazi.
Résistance à la maladie des taches angulaires Phaseoisariefois g. Station Mulungu.
Vigna : Résistance à Rhizoctonia sotini et à la Mosaïque jaune. Yangambi. Résistance à la galle. Elsinoe phaseoli
Arachide: Résistance à la Rosette Mosaïque PNL
Résistance à la cercosporiose PNL
Soja : Résistance à la Bacteriose Yangambi
Résistance à la maladie des taches foliaires rouges Pyrabockaeta glycine.

Entomologie

Opération 11ab. Yangambi

Vigna : Résistance variétale contre les Punaises (Riptorkis dentipes) les Bozers des gousses (Maruca vestulalis) les bruches (colleosobruches maculation)
Soja : Résistance variétale conte les Punaises (Nezara Viridula)

Opération 12 a. Utilisation des insecticides et lutte végétales contre les insectes nuisibles de Vigna, Soja, Haricot PNL - INERA; étude économique.

C. Sous-programme Système d'exploitation agricole

Agronomie

Opération 1 : Enquêtes et études socio-économ. rurale facteurs limitants la production paysanne. Suivi et évaluation du matériel végétal introduit par INERA, PNL, PRONAM, PNM. Soja, Maïs, Manioc.

Opération 1 bis. Production de semences, [illegible]

Opération 2 : Fertilisation sur Arachide, soja, manioc, [illegible] en liaison avec PNE. Rotation [illegible]. Association [illegible] cultures en couloir en utilisant le Leucaena leucocephala. Interaction [illegible] avec les cultures annuelles associées. Station de Bambey

Opération 3 : Etudes économiques Station de Bambey
- enquêtes prix produits [illegible]
- analyse économique de rentabilité [illegible]
  . des engrais sur [illegible]
  . des insecticides sur Niébé
- Evaluation économique des cultures [illegible], comparaison cultures associées, cultures pures et de la rentabilité d'utilisation des Rejets de Leucaena pour augmenter la fertilité.

Opération 3bis lutte contre les adventices : essais herbicides.

Opération 4 : Etude des systèmes de culture [illegible]
- association maïs/manioc avec ou sans fertilisation
- association maïs/niébé sur application [illegible]
- association maïs/niébé avec manioc plantés [illegible]
- association manioc/[illegible]
- association [illegible] effet [illegible]
- cultures en couloir [illegible] avec ou sans fertilisation. Leucaena/maïs, maïs/[illegible] utilisation d'engrais [illegible]
- comparaison des arbustes pour la mise en couloir Leucaena leucocephala et Acacia albida [illegible] évaluation des rendements [illegible] : coton/maïs + niébé/maïs + arachide (coton seule)
- conduite de la haie d'arbustes pour la culture en couloir : écartement entre lignes et fréquence de taille. Station de Bambey.
- essais travail du sol et [illegible] (Y'a) essais sur Typha
- association traditionnelle mais + Karité à la station de Nioro du Rip. Etude des conséquences du rendement.

Opération 3bis Fixation symbiotique de l'azote utilisation des Rhizobium. Pour le mais, en liaison avec PEN. Programme Engrais National, Section MIL Unité Pilote Inoculation des légumineuses.

D. Sous-Programme Recherche et Développement

Opération 1 : Introduction des légumineuses dans le système culturel traditionnel des paysans (Tarnate à cultures)

Opération 2 : Essais de démonstration en milieu réel (Etude d'Association de cultures, Essais de culture en couloir, etc...).

Opération 3 : Fourniture de semences aux [illegible] Organismes de Développement (ex : SONACOS), [illegible] Gouvernement aux Paysans.

Opération 4 : Tentative d'interconnexion du réseau routier dans la zone de Yangambi ; par l'étude de [illegible], la détermination culturales appropriées [illegible] particulier sur l'étude des dates de semis".

bleau 1. Evolution de la superficie, de la production et du rendement des légumineuses (1970-1984)

AGE	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981 (1)	1982	1983 (1)	1984 (1)
perf. 000 Ha)	200	206	211	217	221	225	229	234	239	244	250	255	170	181	251
oduction 00 T)	115	121	123	127	133	137	139	144	146	156	164	162	104	111	156
ndement /Ha)	0,58	0,59	0,58	0,59	0,60	0,61	0,61	0,61	0,62	0,62	0,61	0,61	0,61	0,62	0,62

urce : Département de l'Agriculture et du développement rural, Bureau d'études, Indicateurs Agricoles 1977 et Plan de relance agricole 1982 - 1984
(1) : Estimation du Bureau Analyse Economique 1984.

ableau 2. Variétés des légumineuses à graines cultivées dans les diverses Régions

ARICOT	REGIONS	NIEBE	REGION	SOJA	REGION	ARACHIDE	REGION
unya	Kivu	Vy50	Haut-Zaïre	Denmar-43	Haut-Zaïre	A12	Equateur + Bas-Zaïre
hinga	-"-	Vy76	-"-	TGX252	-"-	B17	Kasaï-Or + Haut-Zaïre
in. Kyu ca	-"-	Vy67	Equateur	SJ 127	Kasaï	A1152	Haut-Zaïre
lenduri	Bas-Zaïre	M4	Kasaï-Or	SJ 348	Kasaï	A1055	Kasaï
ata	-"-	M81	Kasaï	IR 09	Kivu	A1548	Haut-Zaïre
		Muyaya	Kasaï	UPV-1	-"-	F.T	Bas-Zaïre
				Tokyot Vert	-"-		
				Imperial	-"-		

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Agronome

Cit. Ndala Ndala
Agronome

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Agronome

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