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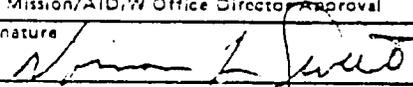
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660-0064

PD-AAJ-332

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

1. PROJECT TITLE INERA SUPPORT			2. PROJECT NUMBER 660-0064	3. MISSION/AID/W OFFICE USAID/Zaire
5. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>81/2</u>	
A. First PRO-AG or Equivalent FY <u>77</u>	B. First Obligation Expected FY <u>81</u>	C. Final Input Delivery FY <u>83</u>	6. ESTIMATED PROJECT FUNDING A. Total \$ <u>6,659</u> B. U.S. \$ <u>3,850</u>	
			7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>July 1979</u> To (month/yr.) <u>March 1981</u> Date of Evaluation Review <u>May 1981</u>	
8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR				
A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)			B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1) Replace and upgrade contractor TA personnel when present contracts expire.			Lane/ARD	Sept. 1981
2) Modify job description for two of the contractor team's technical positions.			Lane/ARD	Sept. 1981
3) Design a comprehensive survey research activity.			Lane/ARD	Sept. 1981
4) Design a broader extension component in the project.			Lane/ARD	Sept. 1981
9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input checked="" type="checkbox"/> Implementation Plan e.g., CPI Network.	<input type="checkbox"/> Other (Specify) _____	A. <input type="checkbox"/> Continue Project Without Change	
<input type="checkbox"/> Financial Plan	<input checked="" type="checkbox"/> PIO/T	<input type="checkbox"/> Other (Specify) _____	B. <input type="checkbox"/> Change Project Design and/or	
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____	<input checked="" type="checkbox"/> Change implementation Plan	
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P		C. <input type="checkbox"/> Discontinue Project	
11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)			12. Mission/AID/W Office Director Approval	
Wilson G. Lane, AADO Richard J. Peters, ADO Mossala Makambo, DG/INERA			Signature 	
			Typed Name Norman L. Sweet, DIR	
			Date <u>7/9/81</u>	

13. SUMMARY

The project consists of five distinct activities: viz. (1) soil testing services, (2) land classification, (3) training of participants, (4) development of high yielding legume varieties, and (5) an overall assessment of the national research capabilities of the National Institute of Studies and Research in Agriculture (INERA). The first four occur at the Mulungu Station in Kivu and the last at Yangambi, the central INERA headquarters in Haut Zaire.

A. The assessment of INERA as a Research Institution

Both Dr. H. Gasser's and Mr. Ray Mildenberger's preliminary reports have been completed. Dr. Gasser's final report is expected in the last quarter of CY 81. He is developing specific recommendations, some of which have been presented already to the Government. Dr. Gasser has discharged his responsibilities well and has a firm grasp on completing his final report.

Mr. Ray Mildenberger has been assessing INERA from the financial and administrative standpoints and has prepared a detailed report on those aspects of INERA. He should now coordinate his report with inputs from Dr. Gasser and develop a recommended budget for operations nationwide. Also, he should provide details as to how the present budget is allocated among the various INERA sub-stations.

B. Soil Testing Services

The chemicals needed for this activity have been obtained and a new, young, French-speaking technician has arrived. He will conduct courses in laboratory procedures and will assist the research and soils technicians at Mulungu. The Project Paper proposed that the soil testing service test 4,000 samples a year in the third year and 8,000 a year thereafter. Progress toward these objectives has started earlier than originally planned. The laboratory technician also will assist and function as part of the extension team working with the soil mapping/classification/conservation activity.

C. Land Classification

This work should be broadened to include soil conservation techniques.

Soil erosion is a serious problem on the eastern slopes of the Virunga Mountain chain from Beni to Bukavu in the Kivu region. Erosion is due mainly to the deforestation caused by the population's need for land on which to grow food and to expand quinquina production. Techniques must be developed to permit the people to feed themselves from the land without destroying it. The soil scientist also should be part of the extension team and should work closely with the extension and research advisors. He will continue training of counterparts. To support migration of peoples to less populated areas, this technician should be able to locate lands with food production potential.

D. Training

The project planned for the training of 11 participants, seven in soil science and four in research agronomy, plant diseases, and entomology. Two participants have gone to the United States. One will return to replace the soils lab technician and the other will replace the research agronomist. Both will return before the project ends. Additional participants are scheduled to begin training later this year and early next year. They may be trained to carry on coordinated research projects at Mulungu or other research stations. They should be able to conduct on-farm trials and to simulate farm trials on the station under the supervision of the Station Director and with the guidance of the extension advisor. A new extension advisor is being prepared for assignment. He will lead the National Legume program's outreach effort and will replace the American sociologist now working on extension.

E. High-Yielding Varieties

This activity is the project's most serious concern, not only from the standpoint of finding the best-yielding varieties under farm conditions but also in determining if legumes should be the focus of research and if soybeans should be considered. Some of the evaluators claimed that, even though soybeans are grown in the area, they are not seen as an alternative to other legumes. They are cited as harder to cook and unpalatable, and may be seen as a food only for babies. It has been suggested that other crops, such as

bananas, cassava, and corn, may be of more importance to the farmer. This question needs to be examined through a farming systems approach to the project's agricultural research. Questions as to why certain crops are grown in preference to others, availability of labor, and production costs must be determined so that research can focus on the priority constraints experienced by the farmer. Development of answers to these questions can be accelerated by use of the short-term consultants programmed for the project.

14. EVALUATION METHODOLOGY

An evaluation was scheduled to take place 14 months after the technical assistance team arrived. It was organized and accomplished on the 16th month of the project's life. The main purpose of the evaluation was to verify the project's hypotheses and to recommend improvements in implementation.

The evaluation team included an economist/sociologist, Jocelyn Albert, and an agronomist, Roy Bronson, who were provided by REDSO/WA. James Keyser, an anthropologist, was provided by AID/W. INERA, as an institution, already was being evaluated by two of the specialists contracted by the project for that purpose. Therefore, the main concern was with the project activities in legume package research at the Mulungu Station. The evaluation was conducted during the period January 28-February 13, 1981.

Bronson, Albert, and Project Officer Wilson Lane traveled to the Mulungu Station on January 28 and were joined by Keyser on February 6. Lane returned to Kinshasa on February 6, followed by Bronson and Albert on February 8. Keyser remained at Mulungu until February 13. Subsequently, all met in Kinshasa to assemble their findings. A consolidated report was drafted by Keyser on behalf of the consulting evaluators. That report is annexed to this PES along with the separate reports of the individual evaluators.

The evaluators were able to meet with all of the Multinational Agribusiness Systems Inc. (MASI) contractor team members, including those at the Mulungu Station, as well as those working on the global evaluation of INERA. While in Mulungu, the evaluators also met with the research station administrators and the 11 counterparts working with the MASI team. They also traveled in the Mulungu/Bukavu area and visited a nearby German agricultural development project. Albert accompanied the MASI team's rural sociologist on a

day's rounds and was able to participate in a women's foyer meeting and to interview people in the project area.

15. EXTERNAL FACTORS

The eastern portion of the Bukavu region, in which the research station of Mulungu is located, is an area of above-average population densities for Zaire. One of the staples in the local diet is beans, the principal crop with which the project is concerned. Due to increasing population pressures, demands are being felt for higher-yielding seeds. Also, due to the population pressure on the land, erosion problems are becoming serious. The local government is seriously concerned with these problems, and the project may be able to respond to that concern. Therefore, increasing pressure is being applied to speed up research, to distribute more legume seeds in the area, and to look at what might be done to increase other food crop production.

16. INPUTS

Ninety-five percent of the project's planned commodity inputs have been made. No substantial additional commodity inputs are contemplated for the duration of the project.

Some of the evaluators noted that comprehensive survey data had not been collected to update that used when the project had been designed. This lack of organized and analyzed base data on the project environment is a drawback to systematic and coherent project implementation, even though the individuals involved in the project have considerable knowledge not reflected in formal studies or reports. A more focused effort to obtain reliable data should be initiated to correct this deficiency and to help define and refine future project emphases.

The MASI technical assistance team has been on site since October 1979. The technical mix of the team is as originally planned. As a result of the review occasioned by this evaluation, it is planned to add an agricultural economist to the team. He will serve as team leader and will be charged with the study of costs of production in the region as well as the accumulation of data on marketing of food crops. Very few of the short-term technicians

available under the contract have been used. These services should be called forth during the more intensive efforts planned in the final two years of the project.

Training has been slower than anticipated. The project proposes to send 11 participants for Master of Science level training in the US. To date, only three have departed. The question of the quality of candidates proposed by INERA has been raised by the Mission. Consequently, a study should be undertaken to determine and establish selection procedures and criteria that will produce the best available candidates.

17. OUTPUTS

The entire project slipped a full year behind the PP schedule. Consequently, the effective PACD is October 1, 1983. Contractor selection was delayed due to the political instabilities in Zaire in 1977 and 1978. The relative isolation of the project area also contributed to the delays.

The technical assistance team was scheduled to arrive in May 1978 but began arriving only in July 1979. The team was not completely staffed until November 1979 and, as it transpired, did not possess the requisite French language competence.

The outputs listed in the logical framework are on track, albeit occurring approximately a year later than envisioned in the original CPI network (prepared in March 1977).

All programmed chemicals have arrived as of May 1981. This has enabled the project to run tests on the soil samples collected. Counterpart training thus may proceed in the laboratory. The arrival of a replacement US laboratory technician in April 1981, following the departure of the previous incumbent in January, has revitalized the lab work. The new lab technician appears much better suited to the task than his predecessor, having command of the French language among other assets.

The agricultural research management sub-sector assessment is practically complete. This timely effort has allowed the Mission to begin planning its strategy for recommended changes earlier than anticipated.

18. PURPOSE

The project's purpose, as set forth in the PP, is to assist the development of the institutional capabilities of INERA to: (a) develop and test production packages for food legumes, using a participatory research model; (b) provide soils analysis and classification to those interested in advancing agricultural production; (c) provide potentials and limitations of soils in Zaire; and (d) to allocate its resources in an optimal manner. A better statement structure might have laid out the sub-purposes as End of Project Status (EOPS) indicators. These remain attainable and desirable EOPS conditions

By the end of the project, INERA will have a trained field research team dealing with legume production and conducting adaptive-research in a participatory manner. This will include a functioning soil fertility service. And INERA's role in agriculture research will be more clearly defined.

The assessment of the agriculture sub-sector has contributed fundamental insights to Zairian research and has suggested options for improving agricultural research organization and management.

Recommendations

coming forth from this project are seriously challenging the fitness of the present INERA structure.

19. GOAL/SUB-GOAL

The project goal is to increase the level, availability, and the nutritional quality of food production for the low-income majority in Zaire.

Project sub-purposes (a), (b), and (c) as stated in Section 18 can be achieved by the project's completion date. While contributing to goal attainment, these conditions will not in themselves fulfill the goal. The project will develop certain critical tools that can help achieve the goal. But these tools must be augmented by incentive farm prices, improved agricultural extension activities, amelioration of marketing constraints, and other factors outside the purview of the project.

20. BENEFICIARIES

The direct beneficiaries of this project will be the 35 people who will

receive training during the project's life. These include three soil scientists, two agronomists, four land classifiers, one plant pathologist, and one entomologist, who will receive training to the Master of Science level. The rest will receive on-the-job training in soil survey, rural technology, and extension methods including data collection and the basic aspects of food legumes production. Concomitantly, the research organization that these people represent will benefit directly.

The seed multiplication activity in 1981 will provide some 8,000 farmers with improved corn seed, 1,000 with improved bean seed, and an estimated 1,400 with improved soybean seeds. The larger quantity of corn seed will substitute for beans because there was not enough legume seed to plant the total hectareage available the first year. The project had 10 hectares of land available for an improved legume variety. The corn was produced on another 12 hectares available to the project. In future years the percentage of legumes will increase. Distribution of improved seed has led to useful village contacts with the project. These seeds should help the farmers in the area to secure higher yields. At least the same number of farmers should receive new seeds each subsequent year.

It is too early to gauge the likely benefits from soil testing and soil survey work.

21. UNPLANNED EFFECTS

The soil scientist raised awareness of the serious deforestation and erosion problems of Kivu. This has prompted USAID and the GOZ to add soil conservation to project concerns. Another unplanned effect is the discovery that soybeans outyield local beans on the more eroded lands. This should prompt an increase in the percentage of soybeans in the overall bean crop. Further studies are required to determine the acceptability of soybeans. These should be undertaken as the project proceeds.

The project has further exposed the weakness of the GCZ agricultural extension services in passing on new technical information to farmers. The project thus is trying to develop some simple extension methods that can work in the project.

The importance of banana and cassava in the area was noted in the course of the evaluation. The project researchers should bear this in mind with an eye for opportunities to support production of these staples.

22. LESSONS LEARNED

Projects such as this one that are located in relatively isolated areas should allow for longer lead times than would otherwise be programmed. PIO/Cs should have early priority so that commodities may be in place prior to their need. Similarly, technicians should be brought on site only when all their tools and other accommodations are ready, thus allowing them to start their assignments fully occupied. Technical assistance personnel should be thoroughl aware of working and living conditions prior to assignment. And when the assignment entails substantial on-the-job training of counterparts, functional competence in the counterpart's language is essential to the success of the endeavor. To ensure that these various requirements are satisfied, initial assignments of TA personnel normally should be on a tentative basis (perhaps six months) pending on-site demonstration of an individual's full competence and suitability.

Once a project is in process, changes in direction or procedure should not be made until fully discussed with all participating parties. Conversely, once informed decisions are made, then speed in their implementation is in order.

To fully realize the benefits of project research efforts, a more effective extension service and information dissemination system must be developed. This may be a large order in view of the state of the Department of Agriculture present system. Nevertheless, it should be borne in mind that research and extension should go hand in hand if the potential value of the research is to be realized.

The next evaluation should take place in the first quarter of CY 1982 in order to check progress in making the changes recommended in this evaluation, including a broadened research pattern and increased extension contacts. A senior agricultural specialist should be included on the evaluation team.

23. SPECIAL COMMENTS AND REMARKS

This first project evaluation was carried out as scheduled in the first year and a half of project activities. The conduct of the evaluation was somewhat disjointed because of the staggered arrival of the several outside evaluators. More critically, AID was not able to identify and procure the services of a senior agricultural research specialist in time for the evaluation. The absence of this evaluator, and the skills and experience he might have brought to bear in the evaluation, probably detracted from the overall value of the evaluation. Nevertheless, the evaluation served its purpose well in highlighting remediable weakness in project implementation and in stimulating the intensive reviews precedent to appropriate project redesign.

Annexes

1. Revised Critical Performance Indicator Network
2. Report of J. Kayser
3. Report of R. Bronson
4. Report of J. Albert

COUNTRY ZAIRE	PROJECT NO. 660-0064	PROJECT TITLE INERA SUPPORT	DATE 1/23/81	<input checked="" type="checkbox"/> ORIGINAL <input type="checkbox"/> REVISION # _____	APPROVED
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PROJECT PURPOSE (FROM PRP FACESHEET)

To assist with the development of the institutional capability of INERA to; (a) develop test production packages for food legumes, using a participatory research model; (b) provide soils analysis and classification information to those interested in advancing agricultural production; (c) provide potentials and limitations of soils in Zaire; and (d) allocate its resources in an optimal manner.

DESCRIPTION	DATE
(1) PP Approved	9/2/77
(2) Mission receives Allotment	9/7/77
(3) Project Agreement Signed	9/30/77
(4) PIO/T prepared	11/2/77
(5) Renovation of houses started	5/29/79
(6) Technical Asst. Contracts signed	6/11/79
(7) First year lab eqp. ordered	7/15/79
(8) Technical Asst. Team arrives	10-12/79
(9) Remodeling of Mulungu lab started	10/1/79
(10) Research and INERA assessments begin	10/30/79
(11) Legume and variety testing and cultural experiments begin	12/1/79
(12) Lab and house remodeling completed	2/1/80
(13) Soils lab work begins	5/30/80
(14) Soils training short course begins	6/30/80
(15) Data collection training begins	7/1/80
(16) First year lab equipment on site	7/15/80
(17) Order second year equipment	7/15/80
(18) First year participants leave	1/1/81
(19) valuation	1/1/81
(20) Arrival second years equipment	6/30/81
(21) Second participants leave	7/1/81
(22) Completion of research and INERA assessment	12/31/81

CPI DESCRIPTION	DATE
(23) Implementation of short term recommendations	12/31/91
(24) Evaluation	1/1/82
(25) Soils consulting services and classification work begins, lab 4000 samples a year	5/31/82
(26) Legume production package developed	6/30/82
(27) Last participants leave	6/30/82
(28) Extension training begins	8/1/82
(29) First participants return	1/1/83
(30) Project complete	5/31/83
(31) Evaluation	7/1/83

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INERA Support Project

Midterm Evaluation Report

Submitted by James Keyser, Roy Bronson
and Jocylín Albert

February, 1981
USAID/Kinshasa

The project entitled INERA (L'Institut National pour l'Etude et la Recherche Agronomiques) Support was evaluated during the end of January and the beginning of February, 1981. The evaluation team was staffed by Roy Bronson, agronomist (REDSO/W), Jo Albert, economist, sociologist (REDSO/W), and James Keyser, anthropologist (AFR/DR/EHR, Washington).

Jo Albert arrived at Mulungu, the site of the project, on 29 January and Roy Bronson, accompanied by Wilson Lane, Agricultural Officer, USAID/Kinshasa, arrived on 31 January. James Keyser arrived 6 February. Since Bronson and Albert left for Kinshasa on 8 February, the three team members had a chance to discuss the project, but Keyser worked independently until 13 February. Subsequently, the three met again in Kinshasa on 14 February and were able to compare results. The following report draws upon those meetings, the written reports left by Bronson and Albert prior to their departure for Abidjan on 15 February, as well as conversations with and reports by Heinz Gasser and Ray Mildenerger, the two management consultants furnished by MASI.

The team judged that the major objectives of the project were not being met and that it was unlikely that all of them would be met by project completion date in 1983. A short analysis of some of the reasons for this failure is important, since it can offer instruction for the next phase of the project.

1. Project Paper and Design.

Mulungu, a station installed by the Belgians under the Institute National pour l'Etude Agronomique du Congo Belge (INEAC), was chosen as the project site. Situated about 15 kilometers from Bukavu on the lake Kivu this station had been favored by the Belgians because of the area's potential for the production of coffee, tea, and quinine (quinquina). In the late 1970's when the design team entered the area it had the highest population density ($35/\text{Km}^2$) in Zaire and was experiencing food shortages. Severe malnutrition was widespread throughout the area. In general the Project was an attempt to strengthen a research capability of the INERA station located at

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Mulungu and to actually initiate research directed towards improving the productivity of the small farmers.

The final version of the PP contained a number of worthy objectives that were in retrospect not mutually supporting and too many.

The design began by calling for research lead by social scientists to determine the major characteristics of small farming in the area, first, and, secondly to suggest appropriate research to a technical staff. The products of the research efforts were then to be tested on simulated farms on the station and, finally, to be introduced to farmers. The last step would not only be the ultimate proof of a given intervention, but would also serve as a means of examining various methods of extension.

The PP added to this two more objectives. One was to establish a soil classification capability for INERA that would ultimately serve the entire nation. The other was on legume research in order to find improved and disease resistant varieties. Thus the composition of the team already threatened the findings of the on farm research that would suggest and ultimately determine the emphases for the technical group. The PP called for three experts in soil classification; soils scientist, land classifier and a laboratory technician. There was one agronomist to carry out trials in legumes and, of course, the social scientist.

In addition the PP had a strong training component. INERA was to supply eleven counterparts in these various disciplines who would work with the research team and who would receive graduate training in the United States.

The goal of the project was to work closely with the INERA staff to build a research capability to assist the small farmers of the area. This included testing under conditions that simulated those of a small farm and testing on the actual farms. Presumably the outcome should have been improved varieties, improved practices, and a model, or example, future extension workers could follow in actually disseminating these improvements.

The PP did not call for an extension program for its own sake, nor a seed multiplication effort. Nevertheless the PP made provision for delivery to the INERA Mulungu Station: two tractors with plows, harrows, and seeders, along with two threshers and two fertilizer applicators. These items of equipment appear in the Annexes. The farms of the area are not amenable to mechanized equipment by virtue of size, terrain, and low capital formation.

It was only in the Project Agreement that the justification for this equipment appeared. It was to be introduced during the last, or fourth year, of the project to multiply for distribution the improved varieties of seeds that would have been developed through the legume trials.

Finally the PP called for an overall assessment of INERA as a national research parastatal organization and provided two positions, one for an agricultural Research Management Planner and the other for a Business Management Consultant. The product of these two technical experts concerns the Mulungu Station and the AID-INERA project tangentially, but importantly and it will be referred to later.

In sum it is worth repeating that the PP asked for a great deal; farming systems research, the institution of a national soil classification capability, research on legumes, capital assistance to the Mulungu station's productive capacity, and an analysis of INERA as a national parastatal organization. In addition to having a rather wide range of components given the resources allocated, the components were not necessarily mutually supporting.

2. Contractor Performance.

It is not surprising that the contractor, Multi Agricultural Systems (MASI), were forced to choose among the components and emphasize some at the expense of others. As it turned out the activities they chose to emphasize were those requiring strong logistical support.

MASI were aware that the project would be taking place in a difficult environment. They subcontracted an "Administrative Logistics Survey" (letter and report, F. Brett Miller to Gaylord Walker, 31 August, 1979) that

warned of, among other things, the isolation, the lack of infrastructure, and the long delays to be expected in delivering equipment. Personnel chosen to work on the site were to receive a 25% salary increment (differential) in recognition of the hardships they were likely to encounter. Nevertheless, it is difficult to find in any documentation, or from on site investigations that the difficulties prompted any special planning or special measures. On the contrary, each problem seemed to come as a surprise and even though the major ones had been identified at the time of this evaluator, solutions were still not being comprehensively formulated.

The planning and logistical problems of the MASI-INERA project are legion. The staff arrived before housing was ready for them. Equipment did not arrive, or, in at least one instance, the wrong equipment arrived with the result that the soils laboratory was still not in operation eighteen months after the start. Although MASI/Mulungu can, by radio to Bukavu, radio to Kinshasa, and telex to MASI/Washington reach their headquarters within the same day and, although goods airfreighted from Washington or New York can in theory reach Kinshasa within a 48 hours period and goods transported to Mulungu have usually arrived within three weeks (the range being four days to three months), the project still lacks simple off the shelf items.

The difficulty of maintaining and repairing project vehicles was foreseen. The PP contains an extensive list of spare parts. The vehicles arrived late without spare parts. A working shop was not set up. At the time of the evaluation there were still not enough spare parts for all the vehicles. Repairs and maintenance had to be done in Bukavu. Time and precious gas had to be consumed by trips to Bujumbura in the quest for parts. Admittedly ordering of the vehicles and parts was a responsibility of USAID/Kinshasa, but in view of the importance of this to the project it is difficult to understand why the contractor did not insist on greater attention to detail. The contractor did not question the choice of vehicle even when maintenance and gasoline shortages would have warranted serious consideration of a waiver. The difference in price between diesel fuel (1.15 Z/- liter) and

gasoline (4 Z - liter) would have suggested different engines. Although the price of diesel fuel could rise, of course, at any time, the point is that the evaluators could find no evidence of any discussion on this matter and take this as a symptom of what seems to have been a general lack of attention to detail that had serious consequences later on. It must be repeated at the same time that the primary responsibility for ordering vehicles and parts was USAID/Kinshasa's.

Shortages of gasoline have been a persistent problem throughout the project. These shortages have seriously curtailed project activities. They have taken an undue amount of time and attention of highly paid professionals. They have also caused serious interpersonal problems. At the time of the evaluation no solution had been found. In theory the district receives a quota of gas. The local governor has promised MASI a regular allotment. Apparently the price differential between black market gas and legally obtained gas is large enough to guarantee that the promised allotment will not be available. Nevertheless MASI have not worked out an alternative, but continued to deal with the problem piecemeal.

At the time of the evaluation the MASI project had the unexpected good fortune to find 28,000 liters of gas for sale from a private owner. After contacting MASI/Washington the chief of party at Mulungu was authorized to buy \$2,800.00 worth (\$ 1.15-liter), enough for a month.

It is also possible to find fault with the interpretation of the strategy outlined in the PP, the subsequent staffing, and the resultant execution. There was in the original document a call for research conducted by a social scientist on the small farms in order to suggest priorities for the agricultural technical staff. Although, as mentioned above, the PP compromised this strategy to some extent by stipulating the formation of a soils classification capacity and a research effort in legumes, MASI added to this either a misunderstanding of the social science research component, or an indifference. Barton Sensenig, the man selected for the social science position had had no experience in this kind of work, nor did he represent

himself as one who had. His motivation for taking the assignment was to test a method of extension. The misunderstanding by MASI was further demonstrated by the lack of any clear assignment based on the guidance in the PP and by the appointment of a chief of party who did not have the experience or training to give proper leadership for this component. Subsequently the social scientist was officially reprimanded by MASI for an irregularity in following travel regulations and his personal style, but there was no evidence of professional guidance. Last but not least MASI did not insist on strict adherence to language requirements. They did provide French language tapes and encouraged training in Swahili at the Peace Corps center in Bukavu for motivated team members.

3. AID

Both AID/Washington and USAID/Kinshasa have to share in some of the failure that have attended this project. Presumably AFR/DR did convene a technical review committee that could have signaled the contradictions and the optimism of the PP. Likewise a contract selection board could have requested a detailed work plan from the contractor asking them to resolve ambiguities, to demonstrate careful planning, and to justify their strategy.

USAID/Kinshasa could have been more helpful in ordering vehicles and spare parts. They could have also insisted on a more literal adherence to the language requirements. Given its staffing levels, the difficulty of travel, and the autonomy of a contractor it is hard to see how the need for intervention could have been definitively recognized and implemented constructively during what was essentially a start up period. On the other hand, the evaluation team did find evidence of deviation from the guidance provided in the AID Project Officers' Guidebook regarding submission and approval (or disapproval) of vouchers. Ordinarily contractors are made aware of rules for the disbursement of funds and submit vouchers after those disbursements are made. In this case, however, the chief of party was instructed to seek approval from the USAID Project Officer before disbursements were made. The evaluation team were unable to find out why this deviation from standard operating procedure was thought necessary. The project officer responsible during the early part of the project had been transferred to another duty

station. The effect of this unusual procedure was to severely limit the autonomy and powers for improvisation of the MASI team. Although the present project officer is following the standard procedure, apparently history weighs heavily. The MASI Chief of Party still feels it necessary to contact MASI/Washington to get approval for disbursements over \$ 1000.00.

4. INERA

A rather comprehensive analysis of INERA has been undertaken by two MASI consultants. This element was carried out much as a separate project. Apparently it was added to the project paper late and somewhat as an afterthought. While the institutional assessment of INERA in its entirety does not relate directly to the research project undertaken at Mulungu, it nevertheless is critical in providing AID and the GOZ a thorough analysis upon which important decisions regarding INERA's future may be based.

This part of the project was conducted at INERA headquarters in Yangambi and seems to have been less problem plagued than that at Mulungu station. Although one of the consultants assigned initially proved unsuitable, his replacement carried on the activity with success. The two MASI technicians presently assigned to this element seem well suited and they have made considerable progress in examining INERA's situation. Initially there was some confusion about the distinction between the responsibilities of the two consultants, but this was resolved in practice with one focusing on internal management and the other on larger institutional issues.

While comprehensive and specific recommendations concerning INERA's role will await the conclusion of the analysis now underway, the work so far suggests the magnitude of the problem as well as likely alternatives for constructive support. Dr. Heinz Gasser's preliminary report summarizes findings to date and is appended.

That INERA is the heir to INEAC, the Belgian research organization, explains to some extent its present situation. Although INEAC was a leading research institution, its emphases were dictated by the financial and political interests. Emphasis was on export crops and thus on mass production. The crops produced, tea, coffee, quinquina, rubber were grown and shipped from large plantations to be sold on the

world market. An enterprise of this sort obviously required large capital investments and much of the research in support of this was obviously not for the benefit of the small farmer except perhaps indirectly.

INEAC research stations were producing farms as well. Mulungu, for example, produced coffee, tea, pyrethrum, and quinquina. Although extension was the responsibility of another agency, the Mulungu station under INEAC was involved in a program directed at improving water sources, halting erosion, creating fish ponds, controlling livestock disease, reforestation, and introducing improved seed varieties.

Nevertheless, Mulungu was a producing plantation under the Belgians. The major responsibility of the research activity was to support an agro-industry on similar plantations throughout the area. It is reasonable to assume that INEAC was at least partially supported by its plantation and whatever additional support it received from the Belgian government was considered worth the price.

When the Belgians left Mulungu Station they not only deserted the research station, but they removed managerial supervision as well. Although comparative figures are unavailable, the extent of the plant and its present state of disrepair and disuse indicated that production had gone down in the last twenty years. Nevertheless, it was also obvious that production was continuing and that efforts were under way to increase it. INERA/Zaire has reported annual income during the last three or four years at a steady 3,000,000 zaires. This figure is not reliable, nor is the report that Mulungu has been contributing 48,582 Z to this sum. Moreover some of the produce from the Mulungu station never becomes part of a money transaction. It is given or sold at low prices as a subvention to workers. Some is probably taken off and used or sold privately.

When the INERA Support Project was approved the Mulungu Station was in effect an underproducing plantation, employing 400 laborers and 50 supervisors and researchers.

The physical plant was badly deteriorated and, most important, there was no research capability. The contractor had to assume responsibility for extensive repair of houses and offices. Shortly after the beginning of the project demands from INERA began. In spite of an agreement to share equally the charges of electricity, an agreement, moreover, that the INERA administration told the evaluators was just, MASI was forced, at penalty of having no power at all, to pay the entire bill. MASI was asked and did provide mobyllets for some of the counterparts. At the time of the evaluation MASI was being asked to expedite expatriate training, to renovate counterpart housing, to repair two trucks, to contribute to counterpart salaries, and to improve plant facilities. As has been seen, the PP called for mechanical farming equipment that had, during the early stages of the project at any rate, a tenuous relevance to the research being undertaken. This had arrived in Kinshasa and was in the process of being delivered. MASI will be expected to provide maintenance and operating expenses for this equipment. The INERA administration protested to the evaluators about MASI gas tank storage facilities being located in Bukavu on the grounds that these capital improvements would not fall to Mulungu Station when MASI left.

The point of this is to show the ambiguous status of INERA and the difficulty of formulating a policy to accommodate it while at the same time furthering project objectives. The constant pressure for capital improvements to the station and to its productive capacity has created a difficult working environment and compromised the relationship between MASI administration and INERA administration.

In summary, it is clear that a number of mistakes were committed by all the participants. The state of the project as of 13 February, 1981 was as follows.

Although the soils laboratory had not been established, the evaluation team was assured that the necessary equipment was actually in the process of being shipped. Dr. Roy Bronson covered the activities of the soils research team in detail and his report is appended. One member of the soils classi-

cation group, Dr. Carroll, responded to the inactivity forced by the lack of laboratory equipment by diverting his attention to soil conservation. Providing technical back-up for the sociologist, he assisted in the construction of demonstration terraces on the station. His work has brought attention to the seriousness of erosion in the area and the technical feasibility of preventive measures.

It was to the unfortunate agronomist, Dr. George Bridgman, in his additional role as chief of party that all of the vexing and time consuming administrative and logistical problems fell. It is worth describing some of his problems since remedies are necessary both because the future of the project will be endangered otherwise and because it is necessary to free highly paid professionals from unproductive work. The management of the project seemed to have its own life. It began with the chief of party in Mulungu who disposed of a radio in his house for contacting a full time administrative MASI employee, Richard McDonald, in Bukavu. Since banks, gasoline, parts, repair facilities, airline offices and radio communications were all available in Bukavu, his residence there was deemed necessary. If he had been based in Mulungu, it was argued, he would have had to travel to Bukavu everyday with time and gas wasted. Both the chief of party and the administrative aid at Bukavu were questioned at length on this point and their arguments appeared sound. The U.S. Consulate had recently been abandoned and MASI purchased their gasoline storage tank and were paying to have it reinstalled. The MASI network then spread to Kinshasa where they had daily radio contact with an administrator actually under the employ of another contractor. MASI did not contribute to his salary, but they had authorized funds for two local hire assistants and the running expenses of a vehicle. The duties of the Kinshasa based team were: transmitting messages between MASI/Washington (telex) and MASI/Mulungu (radio), the transshipment of equipment, purchasing tickets, and meeting airplanes.

At Mulungu MASI had been authorized five houses that it paid to have restored, furnished, and equipped with appliances. Offices and laboratory

space had been allotted. MASI had four, four-wheel drive Chevrolets Blazers (one at the full time disposal of the Bukavu administrator), two Yamaha 125's (are still on order), and four mobylettes. The only recurrent expense for housing and office space was paying the electricity bill for the entire station and paying guards and gardeners.

With the present vehicle inventory they need approximately 2000 liters of gasoline a month. They have been able to acquire only on the average of 1000 liters a month. They presently have storage capacity for 16,000 liters, but this has never been used. They have recently received authorization to buy two pick up trucks. Two tractors (diesel), a plot thresher, a field plot combine, and two Gravelly mowers are presently in shipment to Mulungu. The addition of these vehicles will add to the POL requirement. Consumption of gas may demand 3000, or even possibly 4000, liters a month. Additional storage facilities for diesel will have to be provided. At the present cost gas (\$ 1.15 - liter) 2000 liters a month for twelve months would require \$27,600 not counting associated costs. Some gasoline purchases had to be made in dollars. At the time of the evaluation the minimum 2000 liters a month quota had never been met and no plan had been worked out to meet it, to say nothing of the 3000 liter requirement once the additional vehicles arrived. In spite of the fact that \$20,000 had been authorized in dollars for buying POL the chief of party had to contact MASI/Washington for authorization for each purchase.

Maintenance of vehicles was likewise being carried out on an ad hoc basis. Upon learning that spare parts, tools, shop manuals and trained personnel were in short supply no long term remedies had been sought. Dr. Bridgmon's days were filled with constant coping and improvising. He was occupied with the smallest details concerning spare tires, for example, or the accommodation of guests. He was the focus of INERA's demands. He was responsible for the output and well being of other team members. In spite all this George Bridgmon carried on and conducted the legumes trials in an highly professional manner. Dr. Bronson spent several days going over

this work in detail and his report is appended. Several promising varieties for selection were identified and the groundwork for improvement has been established. Bridgman on his own initiative conducted trials on forage crops and this work may have some interesting results.

As mentioned above, the sociologist, Barton Sesenig, did not conduct any systematic research on farming practices in the area. He apparently accepted the job with the expectation that he would attempt various kinds of extension work and to be fair he apparently was not discouraged by MASI leadership. Jo Albert covered the sociologist's activities in some detail and her report is appended. The specific interventions he attempted to use, water source improvement, poultry production, rabbit raising, soy preparation, anti-erosion measures, had all been attempted, or were all being tried, by various groups in the area. In retrospect the sociologist's work suffered from insufficient technical experience and support, on the one hand, and from inadequate knowledge of the social, political, and economic features of the region that would have supplied him with a more precise assessment of opportunities and constraints.

The sociologist was attempting to test the capacity for local and autonomous, as distinguished from official, or governmental, development. In spite of the energy this team member devoted to this task and in spite of his accomplishments, the evidence does not seem convincing. The choice of the wrong interventions may be partially responsible, but it is difficult to see how villagers learn about, and gather the means to acquire innovations without the help from some agency. Since in theory all expatriate groups are ephemeral, it would seem to make sense to work through the existing extension service of the Department of Agriculture. It has been argued that the official department service suffers from the Belgian legacy whereby extension agents had a policing and taxing function and that the agents not only continue this practice, but take bribes and extort money and gifts. Even if this is true, these practices are as likely to be the result of poor supervision and training as anything else. In any event, the task of the

sociologist should be to test alternatives in order to arrive at a model for extension work, rather than to perform extension purely for its own sake. Testing of these alternatives is an important aspect of increasing agricultural productivity and rural development in general. The Belgian system for introducing crop improvements, better practices, terrace and road maintenance was backed by legal sanctions. In the present political climate of Zaire these means are not to be applied in the same way, so an effective program will have to rely on enlightened self interest and a highly professional extension service. The sociologist's attempts to generate community interest and activity have been in theory warranted under these circumstances. Moreover, given the general inertia of the project his work stands out, but strictly speaking it was not carefully planned and premature. On the other hand, Sensenig's activities may yet be of some value, depending upon the future directive of the project. At the time of the evaluation he had made contact with all of the various development groups in the area. Many of these were privately funded and were attempting to organize local, autonomous community development projects. Continued observation of their efforts will be instructive.

Sensenig initiated the formation of what is now called the Nyamunyune Extension Center on the Mulungu station. This is the site of demonstration terrace plots. Presently different plantings to utilize berm space are being tried. Courses in food preparation are held there and eventually some of the objectives to soy may be overcome.

Sensenig was also a major force behind seed multiplication and distribution. Although this element of the project is not mentioned in the Project Paper, it appears in the Project Agreement which calls for its introduction during the fourth year. As the justification for the farm machinery, the seed to be multiplied and distributed was supposed to have been the improved varieties resulting from the legume trials. Sensenig reasoned that even if improved varieties were not ready, the villagers' need for a good quality seed during the interim was genuine. He also reasoned that this would help establish a substantive relationship between the research project and the farmers of the region. Finally, he reckoned that the good relations established with a number of communities through the vehicle of seed distribution could be lasting and thus be enlisted for project research activities. These arguments were accepted by MASI and the USAID project officer and the seed multiplication, distribution component was commenced ahead of schedule.

The counterpart training component of the project appeared to be in a state of inertia. The ordinary flow for a counterpart should comprise;

1. Appointment to INERA/Mulungu for graduates with appropriate degrees;
2. Assignment to practical field problems;
3. Instruction in English to the level required by the University of Illinois;
4. Entrance into English language program at the University of Illinois;
5. Posting to an appropriate university;
6. Repatriation with assigned duties at the project for a specified period of time.

The PP called for 11 counterparts to be trained. Two at the time of the evaluation were in the United States. The remainder were restive and dissatisfied. They claimed that, practical field problems were not being assigned, there was no training program as such, they were unoccupied, they had no English instructor and hence had to postpone taking the proficiency exam, and their salaries were lower than that of colleagues in other organizations.

They felt that they had been denied access to challenging teachers by virtue of the staffing and by virtue of the inability of the Americans to speak French. All expected to try to look for better positions after expatriate training rather than return to INERA or Mulungu.

So far some of the major shortcomings of the project have been described and a short synopsis of the current situation has been presented. Before moving on to a discussion of possible alternatives for action it would, perhaps, be of help to offer a brief description of the project setting.

While the eastern portion above 1000 meters elevation of the Kivu Region only comprises 4.09% of the total land area of Zaire it has a high population density (35.25/Km²) and sustains 15.6% of the entire population of the country. Its political importance is not diminished by being situated in the far eastern portion of Zaire sharing borders with Rwanda and Burundi with which it also shares similar ecological features.

The plateau consists of sloping hills with low marshes and enjoys an annual rainfall of 1,445 mm and year round temperature between 16° and 25.5°. In recent times it was settled by the Shi who inhabit the core of the Walungu zone. Mixed agriculturists and pastoralists, they relied on beans, sorghum, bananas, and manioc along with animal products. Because this area was admirably suited for growing coffee, tea, and quinquina, major export crops, there was considerable European settlement and agricultural development during the 1920's. By 1952 there were 1063 European heads of families living in Kivu Region. It is not known how much land was under their control. Some of the large plantations still exist, however, under the present system. The Belgian administration recognized that the indigenous system was subject to certain difficulties and even dangers. The Shi were grouped into chiefdoms and practiced shifting cultivation using steeper slopes and marshes for pasture. As population density grew pasture gave way to cropping. As this use of heretofore marginal land increased so did erosion. Moreover pressure on arable land and continued parcelling left open the danger of famine in the case of unfavorable fluctuations of rain-

fall or crop failure. The Belgians tried to meet this problem in several ways. In a social or political sense they attempted to encourage a more stable relationship between groups of farmers and the land. At the same time they formulated what would be called today a technical assistance program. Under this program farmers in the Kivu were required to plant crops that would guarantee survival and they were encouraged to practice soil conservation measures such as terracing and reforestation. As part of the program trials were conducted on varieties of manioc, beans, and soy among others. Unfortunately the records of these trials were reportedly taken to Belgium.

After twenty years of absence the results of the Belgian efforts to establish a relationship between groups of people and the land in the European sense are unclear. Settlements are dispersed around hills (collines), but they still lack some of the features that would permit calling them villages. Apparently the tenure system is mixed. Chiefs still control large portions of land and parcels are farmed by those who do not actually own the land. This may approximate what is called a redistributive system which is not necessarily, or inherently, lacking stability. Some informants claimed, however, that under prevailing conditions farmers do not enjoy a security of tenure and this is deterrent to long term investments such as the construction of terraces. On the other hand there are small farmers in the area who do own land and thus this hypothesis could be tested.

Lacking firm data it has been estimated from informants' accounts that 50 percent, or slightly more, of a typical farm will be planted in banana trees. Twenty percent will be devoted to manioc, with 20 to 30 percent in maize and beans intercropped, and five percent to none in soy.

The annual cycle can be said to begin in September at the onset of the two rainy seasons. At this time beans, maize, sorghum, manioc are planted with soy going in a little later. At the end of this rainy season in January all these crops are harvested, again, with the exception of soy which is harvested during February. Following a short dry period lasting around two

weeks the cycle is repeated with the harvest coming in May at the end of this rainy season. The months of June, July and August are dry and thus, while double cropping is possible under natural conditions, the long period between the May harvest and the January harvest presents a danger for the small land owners. The months preceding the January harvest is a time of hunger.

A glance at the relative amounts of land for the various crops shows immediately that the greatest portion, perhaps 70%, is devoted to the crops lowest in protein, bananas and manioc. It is natural to imagine that a number of observers have suggested finding ways of altering this disposition of crops to favor those higher in protein. According to informants' accounts, however, the cropping system is determined by the market and by seasonal variations in food supply. Bananas made into beer (Kasix) are the most profitable crop. Although the price for manioc per kilo is about ^{equal} to the price of soy, manioc produces more per given land area and requires less labor. It ranks second in profitability. Corn and beans are next, but beans are largely consumed on the farm. Soy is the least profitable crop. Moreover, while the availability of beans, corn, and soy varies with the seasons, bananas and manioc can be harvested the year round and are, therefore, important survival crops.

Livestock and small animals are also an important food source in this area. A recent survey conducted under the German project at Mushweshwe estimated that the composition of the ruminants was roughly, 22% cattle, 52% goats, and 26% sheep. This gives some idea of the nature of pasture. Pigs are also raised in the area, their number being about half that of cattle. The relative proportion of farmers owning large animals was not obtained. The German survey did, however, include land distribution. Their sample showed that 32% of the farmers disposed of less than 0.4 hectares, 48% disposed of 0.4 to 1.0 hectares, 20% of more than 1 hectare. It is likely that the ownership of animals follows this pattern. Farmers raising animals always had more than one and were likely to have more than one kind. Never-

theless, there still exists common pasture. The rules of access are not known, but it is known that chiefs can sell it and it is decreasing.

Small animals, chickens, rabbits and two south American imports, the guinea pig and agouti, are raised for food. The German experts are not optimistic about raising the total population of animals in the area, although there are some possibilities they will explore with geese, rabbits, and the rodents. Their livestock project will aim at improving breeds and practices. In spite of the long history of herding in the area farmers do not exploit their animals as they could and, as might be expected, animal health is not good. The Germans will also attempt to stabilize pastures in the area, but they were not precise about how this was to be done. The Germans have several experimental ponds on their station at Mushweshwe. The Belgians also made attempts at pisciculture and for various reasons ponds did not outlast their supervision. It will be of interest to watch the progress of this.

It is worth mentioning several other features of the German strategy. They have decided that the 32% of farming families living on less than 0.4 hectares, the group most vulnerable to malnutrition, are beyond help. No extension program can be of benefit to a farmer who lacks the means to profit from it.

The Germans have rejected the notion that the Department of Agriculture extension agents were to be by-passed. They reason that the efficacy of a new system cannot be guaranteed either and that what has been lacking is close supervision and accountability. They also decided against a project in trees. Fruit trees take too long to mature and they reckoned that fuel was not a serious problem in the area. The Belgians did, however, think differently about this.

This description was based on a number of interviews and very few written sources, and is incomplete and, possibly, inaccurate in places. Nevertheless, it possibly can suggest certain opportunities and limits for a research program aimed at small farmers. The farming system is as yet poorly known

and defined.

A research effort to determine more precisely its characteristics would seem to be the first priority, but it is important that this be done with close attention to possibilities offered by technical inputs and that the already identified useful avenues for agricultural research continue simultaneously. The first order of business is getting the two branches of research, social science and agricultural, working in a mutually profitable way.

The social science branch should seek liaison with the best social science faculty in Zaire and get the best students as counterparts. The importance of recruiting highly qualified social scientists from the United States should be emphasized as well and, perhaps, adding to the staff another member, or several long term consultants deserves consideration.

The agricultural search branch has already made some progress and there is no reason why the activities already started should not continue. It now looks as if the soils laboratory will become a reality within the coming months. The groundwork for developing improved varieties of legumes has been established. On the other hand, this group will have to become much more flexible and broad in its competencies, interests, and activities. Ideally this group should be able to make demands on the social scientists and at the same time be responsive to their findings. Additional staffing should be done with great care and a much more liberal use of short term consultants is in order.

Population increase and resultant pressure on land provide one of the most important dynamics of change in this system and, if improvements are possible, they are not likely to be dramatic. Nevertheless there are a number of possibilities and a number of important research topics. Some of these, as noted by the evaluation team, are presented for discussion.

The importance in the Kivu^{of} bananas and manioc as survival foods, as cash crops, and as crops which occupy perhaps 70 percent of the arable land of a small farm cannot be denied. What has, perhaps, diverted serious attention from these crops is the relatively low protein content of both and the ease with which beer can be made from bananas. Informants said that various administrators had tried to outlaw bananas without success. It would seem that, on the contrary, a program to increase the quality and yields of both crops might be more beneficial.

The reasoning would be in accord with an accepted nutritional strategy that assigns redressing calorie deficiency the first priority and the protein deficiency second. The Kivu is one of the regions in the world where bananas are the staple food and the project would be remiss in not taking this into account. Some researchers have stopped looking at the banana as an enemy and the idea of enjoining their efforts to improve yields and varieties, and to find supplements for improving its protein content are not without merit.

Project researchers should also establish a link with the MANIOC
OUTREACH project to begin variety testing.

It seems a great loss not to have investigated much more thoroughly
the work accomplished by INEAC under the Belgians. Practically every-
thing under discussion here was a subject of Belgian interest both
for research and extension. Most of their records and publications
are not available in Zaire. Normally research begins with a literature
search and it is strongly suggested that this project could profit
from following this procedure. Some of the publications are available
in the United States. The rest could be found in Belgium. There is
a reason to suspect that the Belgians documented their extension
work and some very good ethnographical data exists. A social
scientist and an agricultural researcher should be detailed for duty
in the United States and Belgium in order to fully inform project

A similar situation exists for the various crops under discussion in
reference to other African research institutions. It is suggested that
the project take advantage of this work as well. Finally, although the
area of concern lies in the boundaries of Zaire, ecologically it is part
of a zone comprising Rwanda and Burundi. Experiences in this wider
region should be part of the accumulated knowledge lying at the
base of project activities.

The choice of legumes research for an initial research focus was sound inasmuch as beans are relatively high protein content and comprise a significant portion of the staple foods. The evaluation team felt that varietal testing on soy should continue, since an overall improvement of the situation in the Kivu will be the result of an accumulation of modest advances rather than any dramatic break through. Nevertheless, it should be recognized that better varieties will not necessarily increase production. Soy was originally introduced in the Kivu in 1915 because of its high protein content. A suitable variety was found, but soy never had a great success. According to informants it is cultivated by few farmers and at the maximum may occupy up to five percent of the total land on a farm. The reasons given for this lack of popularity were; (1) it is not as profitable as other crops, (2) it requires an intervening technological process before it can be consumed, (3) the local population do not find that it tastes good.

The possibility of using Belgian sources and informants and aerial photographs in order to establish trends in land use should receive serious consideration. The results of such an investigation could determine priorities and suggest possibilities for research.

The term farming system research has been avoided because it is felt that the social science branch should work on a number of priorities

already identified and because this term lacks precision. This is not to suggest that some of the methodologies and topics developed under this general rubric should not be used. Particularly needed are studies on organization of labor force. It is not known, for example, to what extent scarce labor inhibits anti-erosion efforts. Labor inputs required by different crops are not known. This information based on intensive observation of a representative sample would be vital.

One of the social science research priorities is erosion control. This is a case where the technical solutions are known. There seems to be very little justification for adding a soil conservationist to the technical team, therefore, until the social impediments are well known and feasible solutions have been proposed. The impediments to terrace building mentioned by informants; scarce labor, insecurity of tenure, symbol of Belgian oppression, wasted space on berms, were all lacking any empirical verification.

The tenure systems of the area were mentioned often by informants as affecting certain practices, but there was no veritable evidence. This should be investigated by the social research branch and some description of the socio-political system should be forthcoming as well.

Possibilities for developing intermediate technology should be investigated. Presently shelling of corn is time consuming and damaging to the grain. Threshing is likewise done by stick and is damaging to

soy and beans. The directors of the soy bean factory at Murkesa also complained of unacceptable amounts of debris and feces in grains brought to the mill by small producers.

After-crop losses were reported as significant. The Belgians did some work in this area, but whether they developed specific measures that could be used by small farmers is not known.

In general and by way of summary, the social science research should be carried out much more aggressively and with more discipline. Extension trials, although attractive to visitors, should not be attempted until both social and technical feasibility have been determined. Strengthening the social science capability will require, (1) recruiting from the best social science faculties in the U.S. and Zaire, (2) adding personnel, (3) developing disciplined plans, (4) collaborating closely with agriculturists.

On the other hand the agricultural research component should be augmented in accordance to research priorities developed from an examination of farming in the Kivu area. This suggests, for example, that work on bananas and manioc should be undertaken soon. Furthermore, this suggests that the whole spectrum of productive activities should be examined for possibilities of improvement.

SPECIFIC RECOMMENDATIONS FOR THE IMMEDIATE FUTURE

1. Given the resources allocated the PP called for too many tasks which were not mutually supporting. A reinterpretation of this document is necessary. The soils classification unit will presumably have a national orientation. The social science capability should be strengthened and brought into concert with the agricultural research. The latter should be much more responsive to the realities of farming in the area.

Extension activities as defined in the PP were to be limited to on the farm trials and testing of extension methodologies. Extension for its own sake is not properly speaking an INERA function.

By the same token seed multiplication and distribution were not called for in the PP. On farm testing of improved varieties was called for. At present no improved varieties have been developed by MASI/Mulungu. As mentioned earlier, ambiguities on these two points began in the PP and were reenforced by both MASI/Washington and MASI/Mulungu. At the time of the evaluation both the chief of party and the sociologist at Mulungu were firmly of the opinion that extension, seed multiplication and distribution were fully sanctioned, major activities. It has also been noted this has lead to some confusion on the part of INERA/Mulungu.

2. Operational and logistical problems should be thoroughly reviewed and remedies should be found. Some suggestions follow.

A. Insist on much greater autonomy for the Mulungu team in administrative, managerial, technical, and financial decision making. The evaluation team had difficulty in determining to what extent the cumbersome and timid management of this project was the fault of MASI/Mulungu or MASI/Washington. There is, moreover, evidence that USAID/Kinshasa in the start up phase began by demanding prior approval for expenditures instead of reviewing guide lines with the contractor and accepting vouchers after disbursement as specified in the USAID Project Officers Handbook, June, 1980, Page 61 and Appendix B, Page 4. This departure from standard operating procedure may have enforced the overly cautious style of the contractor in this case. In any event, the present system is not only operationally deficient, but it has also been injurious to performance and morale.

B. Provide a full time administrator who under the direction of the senior technical assistant will be responsible for logistics, stores, records, and daily affairs.

C. Provide three accounts. One in dollars should be for POL purchases. Another in dollars in the amount of \$5,000 should be made available for daily business, travel, replacement parts, and emergencies. Both accounts should be used at local discretion. The third is the joint MASI - INERA account in zaires.

D. Provide a full time mechanic who will be responsible for maintenance of all equipment. Provide a full inventory of tools and parts. This would also present the opportunity for a small apprentice training program.

E. Make a realistic assessment of POL requirements, of means of procurement, and of storage facilities. Provide the team with sufficient fuel. The evaluation team examined this problem thoroughly and found that immediate solutions are available.

3. There should be a better relationship between staffing and scopes of work. This means that scopes of work will have to be developed after the reinterpretation of the PP. After the identification of criteria appropriate candidates should be selected. Among other qualifications the contractor should insist on good French and encourage learning Swahili.

4. The relationship with INERA should be more clearly defined. The multifaceted role of INERA as producing plantation, service organization to plantations producing export crops, and a research organization has been complicated by the ambiguous provision in the PP for mechanized farming equipment, precipitate extension work by MASI, and the MASI commitment to a seed multiplication and distribution effort. The clarification should begin, therefore, with the reinterpretation of the PP. Participatory research in the service of small farms is, nevertheless, a new direction for INERA and they may have to be lead slowly.

It will be expected that INERA will continue to press for contributions to recurring expenses and capital improvements. Although some leeway should be retained for bargaining, MASI should for the most part try to avoid open-ended agreements. After 18 months of experience and after redefinition of the project decisions should be made at the highest levels, if necessary, on the amount of assistance that should be given to rehabilitating plant, equipment, and housing; how much to running expenses; and how much to the maintenance and development of the cash crops grown at the station. Certainly some decision should be made about support of the seed multiplication and distribution project.

5. Immediate attention should be given to the counterpart program. Worthwhile curricula emphasizing laboratory and field work should be developed for the various disciplines represented. The library should be rehabilitated. Perhaps a librarian could be brought in on a short-term, two month, consultancy for cataloging the collection and setting up procedures. The staff should decide what periodicals to order and a budget for this and for the purchase of new books should be established. If English instruction cannot be provided in timely fashion, then serious consideration should be given to third country, francophone, expatriate training. INERA should be asked for firm guarantees that counterparts will stay with the project for a specified period of time. The matter of project contribution to counterpart salary, housing, and transportation should be settled.

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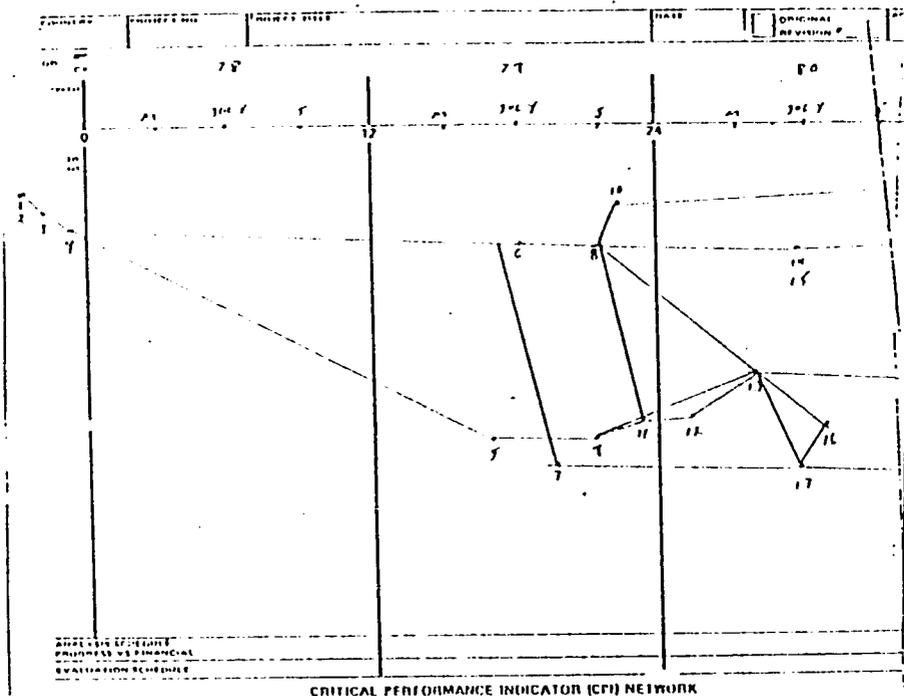
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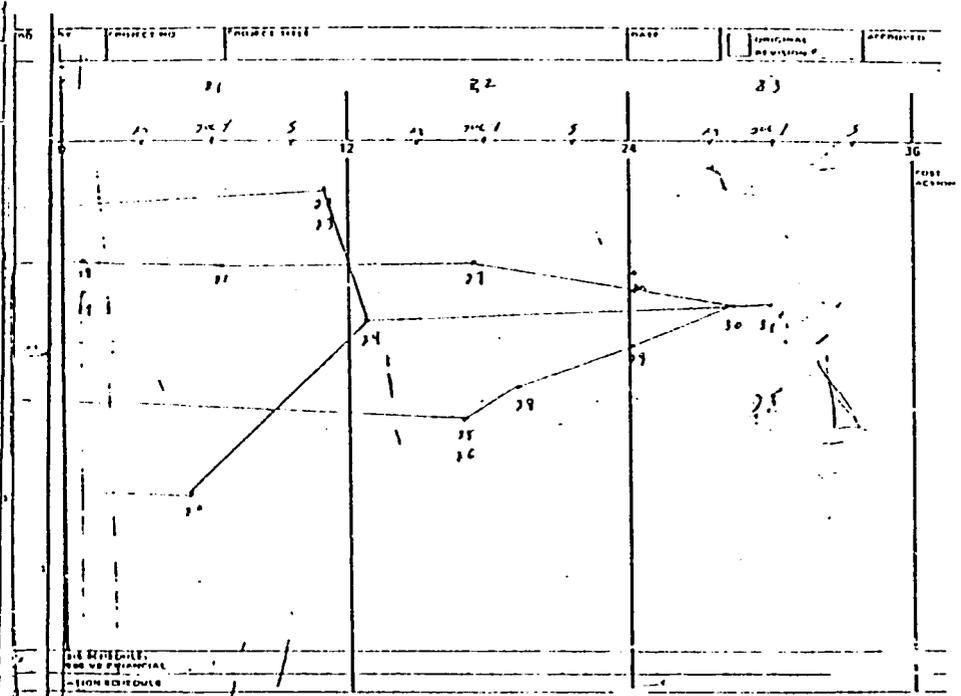
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INERA Support Mid-Term Evaluation

Soils and Legumes Research

Submitted by Roy Bronson, Agronomist, REDSO/W

USAID/Kinshasa

February, 1981

PROJECT-PROVIDED RESEARCH EQUIPMENT

General. Timely delivery of essential equipment and supplies has been virtually impossible due to delays, short shipments, waiver requirements, errors in procurement, erroneous substitutions and misunderstandings of ordering responsibilities. In Zaire extremely difficult and unpredictable communications preclude timely and effective follow-up and the abysmally deficient in-country transport causes further delays. This situation has impeded almost every segment of project effort and has completely blocked certain planned activities. The latter is true in the case of critical chemical reagents and analytical equipment for the soil fertility analysis and soil characterization laboratories. To this date these laboratories can perform only two of a battery of more than twenty determinations which are essential to both soil analysis and correlation research; soil survey, classification and mapping; and plant tissue analysis. A partial list of the problems caused by logistics ineffectiveness follows:

Variety testing and cultural experiments.

- Restricted acquisition of experimental varieties and experimental lines, i.e., narrow germ plasm base.
- Inability to identify positively the causative organisms of plant diseases due to non-shipment of the oil-immersion ocular for the microscope.
- Inability to test the moisture content of field beans due to lack of appropriate charts for moisture tester.
- Reduced scale of field testing due to non-shipment of agricultural field machinery.

Soil fertility analysis.

- Organization and installation of soil fertility analysis system stalled due to non-delivery of some essential chemicals and reagents ordered in August 1979.
- Impossibility of conducting tests for potassium, calcium, sodium and magnesium due to unwarranted substitution of clinical flame emission spectrophotometer for model ordered.
- Conductivity tests for salinity in soils not possible due to omission of the conductivity cell from the conductivity meter.
- Voltage control transformers not ordered for sensitive electronic instruments.
- Soil characterization analysis.
 - None of these tests can be conducted because critical equipment requested in November, 1979 and reagents ordered in May, 1980 have not yet arrived. This has prevented completion of soil classification of samples from the research plots and for the surrounding area.
 - Determination of clay type, essential for soil characterization is also prevented by non-ordering of the pressure membrane apparatus for 15 atmosphere moisture content in soil.

ORGANIZATION OF THE SOIL TESTING LABORATORY

At this point the soil testing laboratory can run soil acidity tests and limited numbers of soil phosphorus determinations. Otherwise it is neither organized nor functional. The logistical problems cited above have been the primary limitation on soils laboratory development. The large chemical stocks left by the Belgians are mostly useless, with very few exceptions, because of age, leakage, and contamination.

A soil testing laboratory manual and operational guide, developed in India by the soils laboratory technician, was translated into French by MASI. Copies were provided to INERA counterparts and were used in the three month intensive soil course described elsewhere.

The above mentioned laboratory manual included plans and specifications for multiple sample handling equipment appropriate for large-scale testing in developing countries. However, none of these essential items was built while awaiting the reagents. The ostensible reason was the lack of wood at the INERA woodshop. Most of the other needed equipment and instrumentation is on hand, except that the distilled water unit for the labs recently broke down and is out of service for the foreseeable future.

Organizing the flow of samples through the analytical process requires the skill of a director or supervisor of a large volume soils laboratory with at least five years of experience, including initial set-up

of the analytical scheme; installation, calibration, and standardization of instruments; and maintenance of equipment. Finally, this experience should have included enough general background in mechanical, electronic, and laboratory skills to enable repairing and improvising equipment under difficult conditions.

SOIL TEST CORRELATIONS

No soil test correlations have been completed due to the lack of chemicals and certain equipment mentioned above. The soil test correlation consists of a mathematically or graphically determined relationship between the analytical soil test figure and the growth performance of the plant under field conditions. Lack of the analytical capability obviously precludes correlation research. A few fields were planted. Lime and rock phosphate were added to plantings of maize and field beans in a few experimental plots during September. Because of the typically high phosphate content of that soil and the relative insensitivity of maize to acidity in the range shown by that soil, these experiments will be of doubtful value. Greenhouse lime response tests were initiated by the soils laboratory technician, but abandoned upon his departure.

SOIL CLASSIFICATION AND MAPPING

These activities, as with other soils programs, have been stopped short by lack of a functional analytical facility. Placement of a particular soil into a named class or category requires characterization by laboratory procedures in addition to the field observation and profile description in situ. Several hundred samples have been collected for characterization. Soil profile pits have been excavated and counterparts instructed in the basic steps of field description of horizons by standard procedures. Since mapping cannot be done before the soils have been properly classified, there are no soils maps.

As an alternative the soil classification was redirected to utilization of the excellent soil maps and descriptive information developed by the Belgians prior to 1959. The finished reports had been removed, but the raw data were left behind when the Belgians departed. The land classifier undertook to codify these data in terms of broad categories according to the INEAC (Belgian) system and to transpose them, first into the modern Belgian classification system, and then to the U.S. Soil Taxonomic System. This work has been completed for the Mulungu Station soils and is well advanced for the Dorsal Kivu which includes most of the montane topography in Kivu Province and which is similar to Mulungu.

As a basis for establishing land capability or soil productivity classes for these soils, it is essential to be able to match the requirements and limitations of the specific crop to the characteristics and properties of the soil upon which the crop is to be grown. An extensive compilation of tropical and subtropical crops by major categories has been prepared and the known climatic soil and environmental requirements and limitations ^{have been} recorded. The information is yet incomplete, but additional data are being recorded for each soil and crop as they become available.

The final step in this procedure is to match the soil characteristics to the crop requirements to determine suitability for production. This is currently being done. Once the soils maps are complete identification of potential crop production areas can be made. This work is continuing, along with the soil loss control efforts described below.

The combination of steep slopes and intense rainfall have lead to serious rill and sheet erosion. Evidence of acute soil loss is widespread and represents possibly the greatest danger to agriculture in the area. The land classifier has undertaken to document the magnitude of soil loss and to devise practical systems for its control. Calculations based on the Universal Soil Loss Equation used by the U.S. Department of Agriculture show that, under traditional cultivation practice, annual soil loss falls within acceptable limits only on soils having slope

gradients of 2 percent or less. These almost-level soils represent only a minuscule portion of the soils in the region.

Under the same conditions, a 30 percent slope could potentially lose its entire "plow layer" (20 cm) in two years. On the other hand, contour terraces with grass-covered berms at appropriate intervals can control 90 percent of this soil loss. Scientifically designed terraces were constructed at two locations with different slope gradients and planted according to local custom.

Storms of intensity sufficient for a severe test have shown that the control structures do in fact reduce the soil loss to about 10 percent of that under traditional clean-cultivated, up-and-down, slope planting with no tree or shrub vegetation protection.

Several terrace construction crews have been trained and at least two crew supervisors are now capable of terrace construction on their own. A significant expansion of this program through cooperation of the project rural sociologist is being planned with possible cooperation of Peace Corps.

Soil survey crew training is still in the plan, but like the soil mapping and classification cannot be implemented at this time.

Variety Tasting and Legume Data Collection

A fairly broad range of food legumes was tested during the initial 15 months of the project. Seed was obtained from a variety of sources in the U.S. and South America including varieties from widely distributed points around the world. The legumes planted out for testing were: soybeans, dry beans (phaseolus), winged beans (psophocarpus), mung bean, broad-bean, lentils, cowpeas, chick peas, pigeon peas and asparagus beans.

Soybeans. Two sets of INTSOY Variety Trials (ISVEX) were planted and performance was recorded on each at the end of 1979 and at the end of 1980. Also, one replication each of tropical and subtropical varieties was obtained and planted. Top yields ranged from 1,800 kg/ha for Bossier in the ISVEX trials, to 1,306 kg/ha for CH-3 in the tropical varieties trials, to 1,516 kg/ha for Davis in the subtropical trial.

Dry Beans. Dry beans for intercropping with maize were received from CIAT, and another set of 15 varieties for planting alone was received from the U.S. Endemic bean rust and anthracnose wiped out most of the western U.S. varieties. The highest yield was 520 kg/ha for Muhinga, a local variety. Another local variety, Munya, produced 341 kg/ha.

Winged bean. Three varieties, TPT-1, Chimbu and a local variety named Mulungu were planted with and without rhizobium inoculum. Chimbu did not germinate nor emerge, but TPT-1 and Mulungu grew well, TPT-1 outyielding Mulungu by more than double in initial trials. Rhizobium

inoculation increased both seed and tuber yield. Both Chimbu and TPT-1 were replanted in the fourth quarter, but grew poorly.

Other crops. Mung beans, broad beans, lentils, chick peas and asparagus beans were planted and harvested. In most cases the quantity of seed was so small that additional increase plantings must be made to obtain enough seed for more planting. Three varieties of peanuts were obtained from southern U.S. in the fourth quarter and were planted out. Growth has been slow and not very vigorous. Plans are being made to try these varieties in the hotter climates and lower elevations of the Ruzizi Valley in south Kivu.

Seed Multiplication. Along with the experimental trials mentioned above, local varieties of soybean and dry beans were planted for comparative purposes. The YR09 soybean yielded with the best introduced varieties, and the Munya and Muhinga dry beans were also near the top of the dry bean yields. These varieties were selected for multiplication for seed to be used in the village extension programs.

Local variety improvement. Plans are underway to make single plant selections of YR09 to produce a superior strain of this local variety which is already known to be well adapted.

Forage legumes. Six varieties of alfalfa and one of clover from the U.S. have been planted out and are surviving. Tropical legumes such as stylosanthes, siratro, desmodium are being sought for inclusion in the trials.

Summary evaluation statements

1. The two principal problems are that the site is isolated, difficult to communicate with and difficult to reach; and that the GOZ and INERA seem to lack the will or the capacity to provide support for a sustained research and training activity like the MASI/Mulungu project.
2. Late or non-delivery of essential equipment, instruments and chemical reagents has essentially blocked the planned soils research and service activity, including soil test correlations, soils analyses and soil survey. Partial progress has been made in soil classification.
3. In planning the contractor did not take into consideration the information provided by its own sub-contracted "Administrative/ Logistics Survey" which warned of the difficulty and long delays in delivering equipment and supplies (letter and report, P. Brett Miller to Caylord Walker, 31 August 1979.)
4. Further, posting of technicians to Mulungu was premature, again ignoring the caveats contained in Miller's letter, concerning the time frame for preparation of housing at Mulungu. This caused morale problems and delayed the start-up of project work.
5. Difficulty of communications, travel, and transport argue strongly against the creation of a Zaire-wide soils services organization at Mulungu. Constraints include chronic shortage and frequent total unavailability of gasoline.

6. The language capability of the MASI team, with one exception, is inadequate. One team member is marginal in understanding and using spoken English.
7. Several of the recruited personnel were unsuited or unqualified to carry out their project responsibilities in the developing world context.
8. INERA support in terms of assignment of counterparts to MASI team members has been slow and uncertain. The assignment of the Zairois agricultural economist has still not been made.
9. The comparative performance testing of indigenous and introduced varieties of food legumes and maize has been carried out in professional manner, on a scale limited by the rather narrow germplasm base, with the exception of soybeans and field beans, which were supplied by the International Soybean Project (INTSOY) and the International Center for Tropical Agriculture (CIAT), respectively.
10. The soil classification and survey studies have been carried forward as far as the laboratory limitations would allow, including collating information for matching soil capability to crop requirements and limitations based on three systems of soil classification.
11. Important basic work on estimated soil losses by erosion, has led to design and initial installation of contour terrace erosion control structures which can reduce potential erosion as much as 90 percent and offset the real danger of loss of this precious soil resource.

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INERA Support Project

Midterm Evaluation Report

Participatory Research

Submitted by Jocelyn Albert
REDSO/W

February 15, 1981

A central feature of the INERA Support Project is the involvement of farmers from surrounding villages in a participatory model of agricultural research. As applied to production and the development of improved production "package", this means that the farmer must be an early evaluator of the practicability of the introduced technology and participate from the beginning in the testing of introduced inputs, technologies, methods, systems or complete production package. In this participatory role, the farmer provides judgments useful and essential to the orientation of research and to its further improvement.

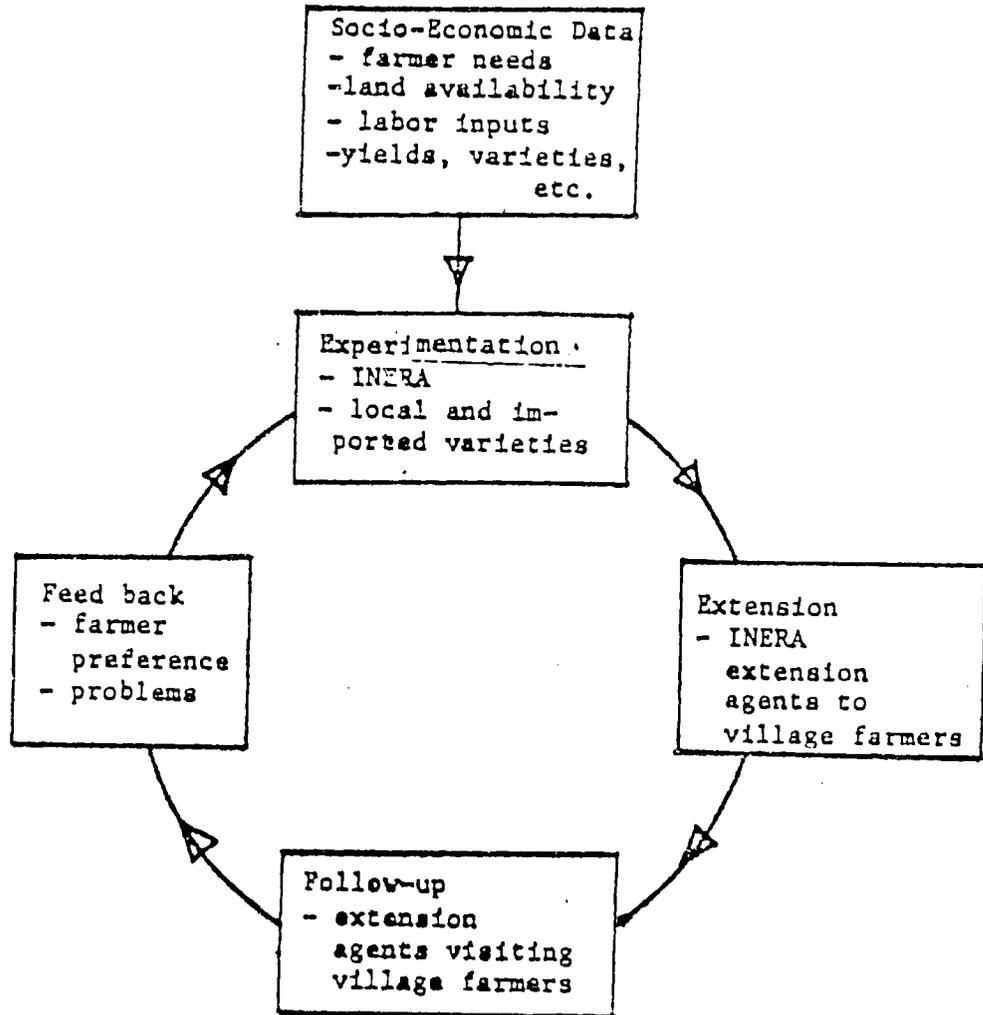
If the research facility is not functional or ready to supply innovations based on informed understanding of local farming systems and farmer needs, the highest priority should be assigned to a coordinated program of collecting essential data upon which to base choices of introducible technologies. Lacking such data, the proposed innovative techniques should be limited to simple, low cost changes which have tangible attractiveness to the farmer. They should preferably be single factor practices which show a yield advantage, risk reduction, labor efficiency, or other profitable character. They should be farmer-manageable techniques not limited by external constraints such as lack of markets, controlled low farm prices, or unavailability of inputs.

The diagram below shows the information flow pattern beginning with socio-economic descriptive data on present farmer agricultural practices, constraints, and preferences. Given this information, agricultural research can focus more specifically on plant varieties that are agronomically well suited to the soils and are socially and culturally acceptable.

Once the new varieties have undergone thorough experimentation and are deemed likely to yield well under actual farmer conditions, area farmers are asked to try the new varieties.

The farmers thus participate directly in the research process by installing and conducting the tests on their farms. These real life conditions lend a local credibility to the results of the tests, avoiding the suspicion attached to tests performed out-of-sight by unknown methods.

At the same time, the direct contact of the extension agent or adaptive researcher with the farmer through on-farm tests provides a pipeline through which current farmer reactions can be used to avoid waste of costly effort on inappropriate technologies. When effectively implemented, the relationship forms a closed loop through which the farmer feedback works to the benefit of not only the farmer but the researcher as well.



Extension Activities

The Department of Agriculture's official extension service suffers from deep-seated resentment and mistrust by villagers. Historically the poorly-trained extension agents served a "policing function of forced cultivations of cotton and collection of licence fees". (PP, p. 17). Without sufficient training to offer technical advice to farmers, they

were seen solely as agents of the Belgian policy of "exploitation imposee".

To avoid having to reform villager perceptions of the extension service, the project chose instead to circumvent the extension service, at least initially and to work directly with the farmers. This approach, dubbed by the project as the "modern farmer" way, is similar to the World Bank's "leading farmer" philosophy where each village selects its more motivated and successful farmers to receive special attention from project technicians on the belief that if the leading farmer experiments successfully with a new technique, seed, etc., the other villagers will be inclined to imitate.

Working through the well-established Bishagala, the Catholic village committees (Communaute de priere), the project visited each of the 15 villages in the area surrounding INERA (7 villages in Bushumba and 8 in Miti), describing the INERA approach to community development. Groups based on the Bishagala were enlarged into development committees to include the non-Catholic population. Each village committee has an elected executive committee with three officers. The vice-president is usually a woman.

Farmer days. Each village committee selected 2 men and 2 women farmers to attend a 2-day training session at INERA's Extension Headquarters at Nyamunyuye in August, 1980. In fact, 18 women and 40 men participated in a workshop to learn new planting techniques for soybeans, corn, dry beans and sorghum, planting in lines with proper spacing, crop rotation, mixed cropping, anti-erosion measures, composting, green manure, nutrition and farm planning. The training staff consisted of the rural sociologist, his wife and his counterpart, the INERA nurse, and an INERA counterpart agronomist.

Participants were asked to plant about 2 x 5 meters of their own land following the new techniques, and to each train 5 more farmers from their villages. In all, about 300 people were to be reached; these farmers also received approximately 2 kilos of YRO-9 variety soy, and 3 kilos of golden corn. Since INERA's spring 1980 dry bean crop had largely failed, no dry beans seeds were available for distribution.

The workshop participants have received one follow-up visit by a woman extension agent on loan from ISDR (Institut Supérieur de Développement Rural). INERA has been especially fortunate in their relations with ISDR due to the INERA sociologist's long-time association with the Institute. The extension agent enjoyed extremely easy relations with the villagers who seemed to both like and respect her. Increased INERA contact with ISDR through a formalized internship program for ISDR students would offer INERA the benefit of full-time extension agents at minimal cost and would provide the student with a challenging internship. Several issues, however, need to be resolved. The greatest of these is INERA's responsibilities toward the student for housing and food.

According to the ISDR stagiaire who visited each Farmer Day participant the women proved to be better students than the men farmers, but fewer women were able to attend the session because of "too many household responsibilities".

The comparison between the modern farmer experimental plots and the land cultivated in the traditional manner are inconclusive. Only where corn was planted in rows was the increase in productivity said to be noticeable. Soy and dry beans seem to yield similarly whether planted in rows or planted traditionally. According to the extension agent, women will be reluctant to plant in rows anyway because it would require a radical change from their present "spitting the seed technique". The evaluator also spoke to a few women trainees who reported no noticeable difference between experimental and traditional plots. The great advantage to having participated in the workshops then seems to be that the farmers had gained easy access to seeds.

A second follow-up visit to measure yields will be done by the two ISDR graduates recently hired by the project. Unfortunately both are men, which could well pose a problem in visiting women's fields. It is strongly recommended that women extension agents (stagiaires from ISDR) be hired to work with woman farmers, thereby reducing the suspicion of the women's husbands.

The extension demonstrations were held at Nyamunyunye, seven kilometers

from the central INERA operations. The Belgians had tried Nyamunyune as a satellite station for slightly lower altitude farming research. As at Mulungu, the buildings and equipment remained after their departure.

The compound consists of 5 offices, 7 rooms suitable for small animal raising, a classroom, granary, covered drying floor, two roofed enclosures suitable for large animal husbandry, and a house suitable for a dormitory. It is surrounded by about 30 hectares of cropland, a slope suitable for anti-erosion demonstrations, and a swamp in which crops can be grown during the dry season. (April - June quarterly report).

Building renovations are slowly transforming Nyamunyune into a demonstration and extension center. The classrooms have been cleaned, chicken and rabbit-raising enclosures have been constructed, and an anti-erosion terrace was built by the trainees during the August program. There are also 4 INERA houses on the premises, which could provide living quarters for extension agents.

Although the Project Paper called for establishing a "simulated farming system" to help the researchers understand traditional Shi agriculture, the rural sociologist has wisely preferred to establish a model farm for extension purposes. With traditional agricultural techniques practiced only yards away the technicians' houses, it seemed more beneficial for pedagogical and practical reasons to use the Nyamunyune resources for demonstrations.

Other extension activities. The project sociologist, his wife and his counterpart, Aliya, held meetings with the village development committees, urging them to define their priorities and to outline a plan of action.

Foremost among problems expressed by the villagers were: the lack of potable water, scarcity of land, erosion, and lack of seeds. Other problem areas were animal husbandry (cows and small ruminants), nutrition and health.

Water points development. Springs development has been a major activity of the Murhesa Development Committee, the Catholic group based in Murhesa (approximately 6 kilometers from Mulungu), composed of village groups (Bishagala) within 40 kilometer radius of Murhesa. The Murhesa Development Committee receives a large part of its funding from the Italian

Catholic organization Mondo Giusto, as well as UNICEF support for its water points development projects.

INERA's extension team of Sensenig and Aliya became active members of the Murhesa Committee, especially in the area of springs development. Twenty-five springs have been developed and cemented since early 1980, and another 5 await cement, sand and the dry season. Villagers contribute a total of 50 Z per spring, helping defray the cost of cement (gift of the Murhesa Committee), and are responsible for the labor.

Working-through the well-organized and respected group of Catholics (Bishagala) has greatly facilitated the community contacts for INERA staff. Their efforts to expand the Bishagala to include non-Catholics seem to have had little impact as yet. For example, the women interviewed corrected the evaluator when she asked about the development committee's role in water point development. "The Bishagala organized it, not the development committee".

Two production projects were introduced by the extension team and neither has, nor is likely to, prove profitable or popular. During the organization and definition of needs and priorities phase, meetings with the village committees indicated a desire for help with cattle raising. Assistance to cattle raisers, or even to small ruminant (sheep, goats) owners falls out of the mandate, expertise, and financial means of the INERA support project. In lieu, the extension team decided to introduce chicken and rabbit raising. Cattle, however, and increasingly small ruminants have important cultural significance for the Shi of South Kivu. They are used for bridewealth and for other kinds of exchange. To assume that villagers would be receptive to chicken and rabbit-raising instead of assistance to livestock does not take into account its cultural significance.

Both projects have run into major difficulties. Rabbits need housing, feed, and care. Vaccines are not easily obtained and several rabbits have died of syphilus as a consequence. Theft has also been a problem.

The chickens need special feed (soy and corn), and vaccines, again not easily found in Bukavu. When the special feed composed of soy and corn for the Nairobi-purchased cocks ran out, the project was forced to sell all 24

of the imported hens and five of the 10 imported cocks at 60 Z each to recoup costs. At such high prices, no Zairois purchased any. According to Peace Corps/Bukavu chicken and rabbit raising specialist Cit. Kapeleti, few (if any) of these projects succeed because of the high cost, risk of disease, lack of vaccines and feed. Poor farmers are unwilling to invest in such a high risk proposition.

Extension efforts for women. Separate activities for women have been organized under the sponsorship of foyers sociaux (social circles). The idea of the foyer dates back to the Belgian missionaries' sewing circles where women learned the European domestic arts of sewing, cooking and homemaking.

Using the commonly known idea and name of foyers, the extension team tried to reorganize the women, keeping the name and hence a certain set of expectations, but changing the curriculum to concentrate on nutrition and health. The organizational model is similar to the "modern farmer" or training of trainers approach used in agricultural extension. Each village group selects two or sometimes three women to attend lectures given at the INERA headquarters. These women will in turn communicate the information and skills to the women in their own villages.

There were presently seven active foyers sociaux with membership ranging from 25-50 women and a newly hired woman extension agent is being trained to replace Ms. Sensenig who was recently repatriated.

Although the extension team has tried to use the well known and popular concept of foyers sociaux as a vehicle for organizing women, their effort seems to be ill-conceived, poorly planned and of questionable value to the goals of the INERA Support Project.

Nutrition education. The South Kivu area of Zaire suffers from an especially high incidence of malnutrition among its children. Infant mortality rates are estimated at 230 per thousand. The chances of dying before the age of five are double (Project Paper). Kwashiorkor in South Kivu is believed to be the result of a diet high in calories (manioc) and low in proteins (soy, and other legumes). Missionaries introduced soybeans in an effort to increase the protein content of the villagers' diet. (The appropriateness

and acceptability of soybeans will be discussed in the next section). The anti-Bwaki (anti-malnutrition) committee of Bukavu has tried to encourage consumption of protein-rich soybeans by subsidizing the price of soybean flour to local dispensaries as part of their nutrition campaign.

Since soybeans require special preparation to be acceptable to villagers a nutrition education campaign has been an integral part of the soybean outreach program.

The nutrition classes held for the women of the foyers sociaux were part of this Anti-Bwaki effort. The 7 classes conducted by Ms Sensenig and Chemi Sole, the INERA nurse, covered the three basic food groups. Women were given recipes for preparing soy so that it was suitable for weaning and other daily dietary supplements. The problem was that most women for various reasons did not grow soybeans, and consequently could not use the recipes. Of the 35 women participants in one foyer social, only 2 women grew soybeans and none had used any of the recipes. The cost of soy flour is prohibitive, they say; and they could not get any seeds to plant.

Surely efforts to improve diet start somewhere and nutrition education is crucial to the successful introduction of new food. But the inability of the INERA team to provide soybean seeds to the women meant that the women were taught "quite useless" information, and not able to apply it. The integrity of the extension effort suffers from severe credibility problems in such instances. Until the extension team can provide soybeans, or they can be purchased in the market, the necessary ingredients for a successful nutrition education program, it is better not to raise villager expectations. This example demonstrates real limitation to the extension efforts.

Secondly, a nutrition education curriculum should be designed by a qualified, experienced nutritionist after completing a nutrition survey (24-hour recall) to determine what food elements are commonly found in the diet. The approach used by the extension team was 'both feet first' without having any concrete data upon which to base the curriculum. (The National Nutrition Program and IRS have done nutrition surveys in the south Kivu area, this did provide a basis, but not a substitute for first data).

Vegetable growing. Common extension philosophy contends that one does

not extend and encourage agricultural practices until they have received the benefits of qualified, rigorous experimentation and have a reasonable chance of success under actual farmer conditions. Otherwise, the professional credibility of the extension program can be seriously undermined and farmers will lose confidence.

Unfortunately, untried imported varieties of vegetable seeds were sold to women under the auspices of the foyers sociaux. The extension team lacked the agronomic information needed to multiply the vegetable seeds. Although the harvest from this year's crop is just coming in, preliminary reports from both the extension team and women vegetable growers indicate dismal results. Vegetable seed production should not continue until adequate experimentation is done by qualified agronomists.

Sewing. The concept of foyers sociaux has a long history and represents a definite set of expectations by women members. Broadening the range of usual activities of the foyers sociaux to include nutrition and health may be a good idea, but the women will not be short-changed. During two foyer meetings attended by the evaluator, the women made it quite clear that they want to learn to sew as a first priority. Sewing classes pose a whole set of problems. Who will teach? Where and how will the materials be purchased? How will women organize to purchase the material? All of these questions must be dealt with jointly by the extension team and women members. The evaluation team finds time spent on such activity is of marginal importance (and probably negative effect if the team can't deliver the goods) to the INERA Support Project.

Role of women as producers. It is well known that Shi women contribute a substantial labor input to agricultural production in the south Kivu region. (Data was not collected by the MASI team). Any project whose goal is to increase agricultural production and to improve the living standard of the villagers through new technology must necessarily target much of its interventions at women. Women must be a primary focus of extension efforts.

With the limited human and financial resources available at INERA, the extension team should concentrate on helping women farmers better fulfill their roles as producers. Encouraging women to attend Farmer Days by schedul-

ing them so that they don't conflict with other farm and household activities, hiring women extension agents to facilitate contacts with farmers, and urging women to at least attend village committee meetings are just a few steps the project can, and in some cases is, taking to ensure the full participation of women. Dissipating resources on sewing circles and endangering the extension team's credibility through untried vegetable projects do not seem to be in the purview or best interest of the INERA Support Project.

Data Collection

In a country desperately needing to increase its food production such as Zaire, the greater value of agricultural research lies in its direct applicability. Applied agricultural research (in this project, the development of a culturally acceptable legume package), requires the combined efforts of agronomists, soil scientists and social scientists. Each contributes vital information to the determination of such a package.

The social scientist is responsible for collecting various types of economic, technical and socio-cultural data. Without information on inputs, yields, income, cultural practices land tenure systems, division of labor and family size, the agriculturalists risk devoting years of time and money to a socially unacceptable package. In short, we need to know who grows what crops, how, why and where.

Unfortunately, despite the fact that data collection was the single most important aspect of the social scientist's scope of work (and certainly received adequate coverage in the project paper), none of that information became available to the agriculturalists (or to the evaluation team which found it difficult to evaluate the social acceptability of the project with no one able to offer even a brief description of the ethnic group in the area). There has been no effort at systematic data collection.

While the evaluation team appreciates the team social scientist's desire to establish a rapport with the villagers in the 15 villages surrounding INERA prior to data collection and the problem with mobility due to the late arrival of project vehicles, it seems irresponsible and short-sighted that descriptive data (labor inputs to different crops, sex division of crops and labor, intercropping systems, land tenure arrangements) was not

collected sooner while more sensitive data (production figures, income, sex division of income, migrant labor) collected at a later date. The importance of this information to agricultural research cannot be overestimated.

A very rough approximation of the number of inhabitants in the INERA extension area is available for planning purposes. The census was undertaken by the newly formed village development committees as a first task. No explicit instructions were given to the census-takers, except to count the number of people on each coline (hill). Consequently, the figures received provide gross estimations at best, since it is not specified whether the figures represent the total number of family members, or those presently living in the compound. Nor is there a definition of production and consumption units.

Training

Although accounting for only 6% of total project costs, the training component is perhaps the most important project component. Certainly the Zairois, in discussions with the evaluation team, perceive both the on-the-job training and U.S. training aspect as one having the most long-term tangible impact of the INERA Support Project.

According to the Project Paper eleven Zairois were to be sent to the U.S. for training in the following fields: soil science (3), agronomy (2), land classification (4), plant pathology (1), entomology (1). In addition, several Zairois are to receive on-the-job training in soil surveying (8), rural sociology (1); agricultural economics (1); lab technology (3), field crop technology (2). Extension agents are to be trained in data collection and in technical aspects of food legumes production packages.

Progress has been slow: only 2 Zairois have left for the U.S. (January 1981), 5 potential candidates are now at Mulungu, and no one claims to have trained anyone on-the-job. The one notable exception is the counterpart relationship between the rural sociologists, Sensenig and Aliya. They work as a well-coordinated team, consulting each other on all program decisions. Both benefit from the two-way relationship. Aliya is now applying to Cornell University's rural sociology program for the fall, 1981 semester.

There appear to be three major reasons for training delay and

ineffectiveness: (1) lack of equipment; (2) insufficient language skills of the American technicians causing communication difficulties; and (3) difficulties in recruitment and retention of the counterparts.

1. The late and piecemeal arrival of laboratory equipment has meant that both American technicians and Zairois counterparts have lacked the necessary material for conducting applied research. The counterpart to the soils fertility technician has had "nothing to do" for 18 months. The land classifier has taught his counterpart how to collect soils samples, which now await the reagents for any further work to be done. The plant pathologist suffers from the same problem. Only the rural sociologist's counterpart has been unaffected by the delay. (Aliya's major problem was with lack of transportation, a situation not redressed until his motorcycle finally arrived).

2. The combined rudimentary English language skills of the Zairois counterparts and the rudimentary French language skills of the American technicians leaves an enormous communication gap. The basic soils fertility course given by the soils men were, according to the counterparts "totally incomprehensible" and hence of "minimal value". Since they had already taken the 3-month course in French during their university days, they were able to follow the basic concepts, but learned nothing new.

Again the sociologist's counterpart was the exception because Sensenig not only speaks French, but has also learned Swahili.

3. Low salaries, and no equipment and operating budgets at the INERA-Mulungu station do not offer attractive rewarding professional opportunities for agronomy graduates. Young graduates would prefer to live where the work environment is conducive to productive research. These conditions do not exist at Mulungu, and so the station suffers from a high attrition rate and low morale of its personnel. With no vehicle with which to go to the field, barely subsistence salaries (2/3 of what the local high school teachers receive), and no laboratory equipment, Mulungu can neither attract the best graduates nor keep the ones assigned.

Recently, housing of Zairois counterparts has become a contentious issue between the MASI team and INERA. The Director of the Mulungu station is

requesting - in fact insisting - that AID pay for refurbishing counterpart houses. Apparently, INERA has no funds with which to do this and if the Americans want counterparts, they have to house them according to Dr. Mundundu.

The situation is quickly reaching an impasse, exacerbated by personal tensions between U.S. and INERA staff, and must be resolved expeditiously in order for the maximum number of Zairois counterparts to benefit from U.S. training.

It seems to the evaluation team that counterpart housing is a Zairois responsibility. Questions such as whether or not the family of a U.S. bound trainee continues to occupy the same large house while the trainee is in the States definitely need to be resolved by the Zairois. However, if some U.S. financial assistance (in Zairas) would help alleviate the problem, such assistance should be given serious consideration.

Other problems. In addition to the 3 areas mentioned above, the training of Zairois counterparts has encountered other difficulties. Because the American plant pathologist is also Chief of Party and preoccupied with apparently overwhelming logistic and administrative problems, the counterparts to the plant pathologist complained that they have received little instruction in plant pathology and a bit more in general agronomy. The counterparts told the evaluator that what they needed most was field experience. "We learned the theory in university" they said, "and now what we want most but are not receiving is practical experience". The Chief of Party admits that in an inordinate amount of his time has been spent on administrative detail.

Secondly, there has not been enough interaction between the technical and extension components of the project, as both parties readily admit. The agronomy and soils people complained that their advice and participation was not enlisted for the extension demonstration (Farmer Day) held in August. One agronomist who is now in the U.S. did participate, but the technicians argue that they should all have been involved, especially as they have little else to do.

The lack of interaction between and among staffs seem to be due mostly to interpersonal and institutional problems and are reflective of the

project team's overall lack of strategy and purpose.

Several actions are incumbent upon the MASI team and the INERA staff to take full advantage of the training opportunities.

1. The laboratory equipment must arrive soon.
2. English classes for the Zairois counterparts began in February 1980, but stopped upon the departure of the English teacher in June. English instruction must recommence soon if the counterparts are to score acceptable results on the TOPEL exam in May.
3. The American staff must learn to speak French to communicate with the Zairois.
4. INERA must resolve the housing problem for its counterparts.