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ZAIRE

CENTRAL SHABA

AGRICULTURAL DEVELOPMENT PROJECT

(660-0105)

U.S. Agency for International Development

START-UP EVALUATION

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EXECUTIVE SUMMARY

Project Objectives

The Central Shaba Agricultural Development Project is a seven-year project (1986-93) aimed at assisting the Government of Zaire to achieve self-sufficiency in staple food crops, particularly corn, in two of Zaire's major corn deficit areas, the Shaba and Kasai-Oriental regions.

The project purpose is to stimulate local private sector involvement in and support for small-farmer production of basic food crops in central Shaba, as well as the marketing and processing of these products. These objectives are to be achieved through three principal actions: (1) the provision of extension support, improved seeds, and crop storage facilities to farmers in Central Shaba, as well as the rehabilitation of feeder roads in the area; (2) the provision of physical and institutional infrastructure to support private sector activities in crop storage, processing and marketing of staple food crops; and (3) the creation of opportunities for private sector entrepreneurs and non-profit organizations to participate in increasing and sustaining basic food crop production.

Project costs were expected to total \$59.1 million. Anticipated funding sources included Government of Zaire (local currency equivalent of \$24.4 million, including \$16.4 million in Counterpart Funds), AID (\$33.9 million), and Peace Corps (\$0.8 million).

Scope of the Evaluation

This evaluation, which is defined as a Start-Up Evaluation, addresses the following issues: (1) the continuing validity of assumptions underlying project design and solutions to problems arising from design misassumptions or changed circumstances; (2) the appropriateness and effectiveness of project management systems and personnel; (3) progress in achieving project objectives; and (4) constraints to timely and effective project implementation and recommendations on ways to eliminate these constraints.

The Organization of the Project

Project activities are organized into three discrete components, which include agriculture (extension and storage activities, and the information office), seed production and distribution, and roads rehabilitation and maintenance. The

agriculture activities are administered directly by project personnel, while the roads component is implemented by the Government of Zaire (GOZ) Roads Bureau and the seed activities are managed by a private sector company. The coordination and integration of the activities of the three components are the responsibility of the Project Coordinating Committee, which is composed of senior GOZ and USAID officials. Daily operational guidance and coordination are performed by a GOZ/USAID Project Activities Coordination team, which serves as an informal Chief of Party for the overall project.

Major Findings and Conclusions

1. The Agriculture Component

Project extension activities are based on an innovative form of the training and visit system -- the small extension staff works closely with carefully selected contact farmers who provide advice and guidance to other farmers. To date the extension activities are over one year ahead of the Project Paper (PP) implementation schedule. With a staff of only 25 field agents, the extension network now covers 250 villages; a total of 869 contact farmers, including 142 women, have been identified and trained, and 399 demonstration fields have been established throughout the project area. The main constraints to the success of the extension component are weaknesses and delays in the development of support activities, such as adaptive research, seed multiplication and distribution, and the rehabilitation of the road network.

The Information Office has not yet been established due to delays in staffing.

Although village and farm-level crop storage activities are to be initiated in the near future, the more urgent need is the installation of crop storage facilities at railhead centers where the shortage of rolling stock and lack of storage are causing significant crop spoilage.

2. The Seed Component

The strategy of using a private sector company (Trabeza Mbeko Shaba) to implement the corn seed production and marketing activities is a novel aspect of project design. However the company's experience in seed production and marketing is limited, and it has no experience in servicing large numbers of widely-dispersed small farmers. Although the technical assistance sub-contractor, Zimbabwe Seed Cooperative (ZSC), can clearly provide excellent seed production support to Trabeza, it is doubtful that ZSC can provide the management and marketing assistance which will be necessary.

Despite the eleven-month delay in the signing of the contracts with Trabeza and ZSC, the first year target for seed sales to the project area has been exceeded. Preliminary financial results indicate a significant loss on project operations, but with the contribution of the project start-up/risk payment, the overall financial results will show a profit.

Trabeza's interest in continuing to serve the project area when start-up/risk payments are terminated will depend partly on its ability to provide a unique/high value product and to increase the size of the project market. This may require the diversification of their product line to include both open-pollinated varieties and hybrids adapted to low fertility conditions.

3. The Roads Component

Several of the key assumptions in the PP concerning the roads component are no longer valid; most notably, the Roads Bureau is no longer able to cover its operating costs for project activities. As a result, road rehabilitation and maintenance activities have virtually stopped.

The roads component is presently over one year behind schedule. It is estimated that additional dollar funding of approximately \$5 million would be needed to complete projected activities, in addition to local currency funds for the Roads Bureau operations.

An emergency road repair program is urgently needed to allow the evacuation of the 1989 crop harvest. After the completion of these repairs, the projected rehabilitation activities will require 3-4 years; thus these activities could be completed by the Project Completion Date, late 1993.

Principal Recommendations

The Agriculture Component

1. The project goals should be amended to account for the shift of emphasis from corn production to multicropping.
2. The national agricultural research institute, RAV, should play a more active role in the location-specific adaptive research of the project.
3. To consolidate the knowledge of contact farmers, the extension unit should slow down the pace of selection of new candidates.
4. Extension agents should receive basic economics training in order to better advise farmers on choices concerning themix and rotation of crops.

5. Baseline agricultural data for the project area should be collected as soon as possible; if there are further delays in the staffing of the Information Office, this data collection should be performed under a short-term contract.
6. Preliminary plans for the design, construction, and management of a system of simple crop storage facilities located at railhead centers should be finalized in the near future, and implementation should be initiated in early 1989.
7. Additional funding for the agricultural activities should be considered in order to compensate for necessary changes in project design and implementation schedules, as well as additional needs which have arisen since the design period.

The Seed Component

8. Trabeza should be requested to submit an action plan detailing its 1989 strategy for developing a sales and distribution network in the project area.
9. Trabeza and ZSC should prepare a joint technical assistance plan outlining Trabeza's exact needs and ZSC's ability and willingness to meet these needs. USAID should advise Trabeza on other sources of technical/management support, if such support is necessary, and consider providing additional funding to obtain for this support.
10. The extension service should continue to offer advisory support to Trabeza. However extension agents and contact farmers should not be obliged to serve as sales agents, as this may jeopardize the execution of their project responsibilities.
11. The start-up/risk payment schedule should be adjusted to cover a sixth year, in order to compensate for start-up delays.
12. Consideration should be given to including hybrid seed sales in the start-up/risk payment plan in later project years.
13. The seed certification policies and requirements of Bunasem, the national seed certification agency, should be reviewed so as to assure that required standards are not inappropriately sophisticated and costly.

The Roads Component

14. USAID should make immediate provisions to provide operational funding for the Roads Bureau's project activities. It is recommended that performance-based salary supplements also be seriously considered.

15. All current road rehabilitation should be stopped and available equipment utilized to implement an emergency road repair program.
16. A labor-intensive road maintenance program for project roads should be designed and implemented immediately.
17. Upon completion of the emergency repair program, equipment should be regrouped and combined with new, anticipated equipment deliveries to permit concurrent utilization of 2-4 rehabilitation brigades.
18. Construction schedules should be developed to determine the extent to which contract rehabilitation of roads should be introduced into the program to complement force account work. The higher costs involved in contract work would be compensated by more expeditious completion or the rehabilitation program.
19. The Roads Bureau should be phased out of road rehabilitation programs and limited to maintenance of existing networks. Labor-intensive procedures should be introduced whenever possible and separated institutionally from equipment-based maintenance.
20. The project design should be reviewed to assess the possibility of utilizing stage construction techniques for the rehabilitation of the link road (progressing from single-lane earth road design to two-lane all-weather roads as traffic volumes increase). The possibility of improving the river transport system in the eastern part of the project area should also be investigated.

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PROJECT DATA SHEET

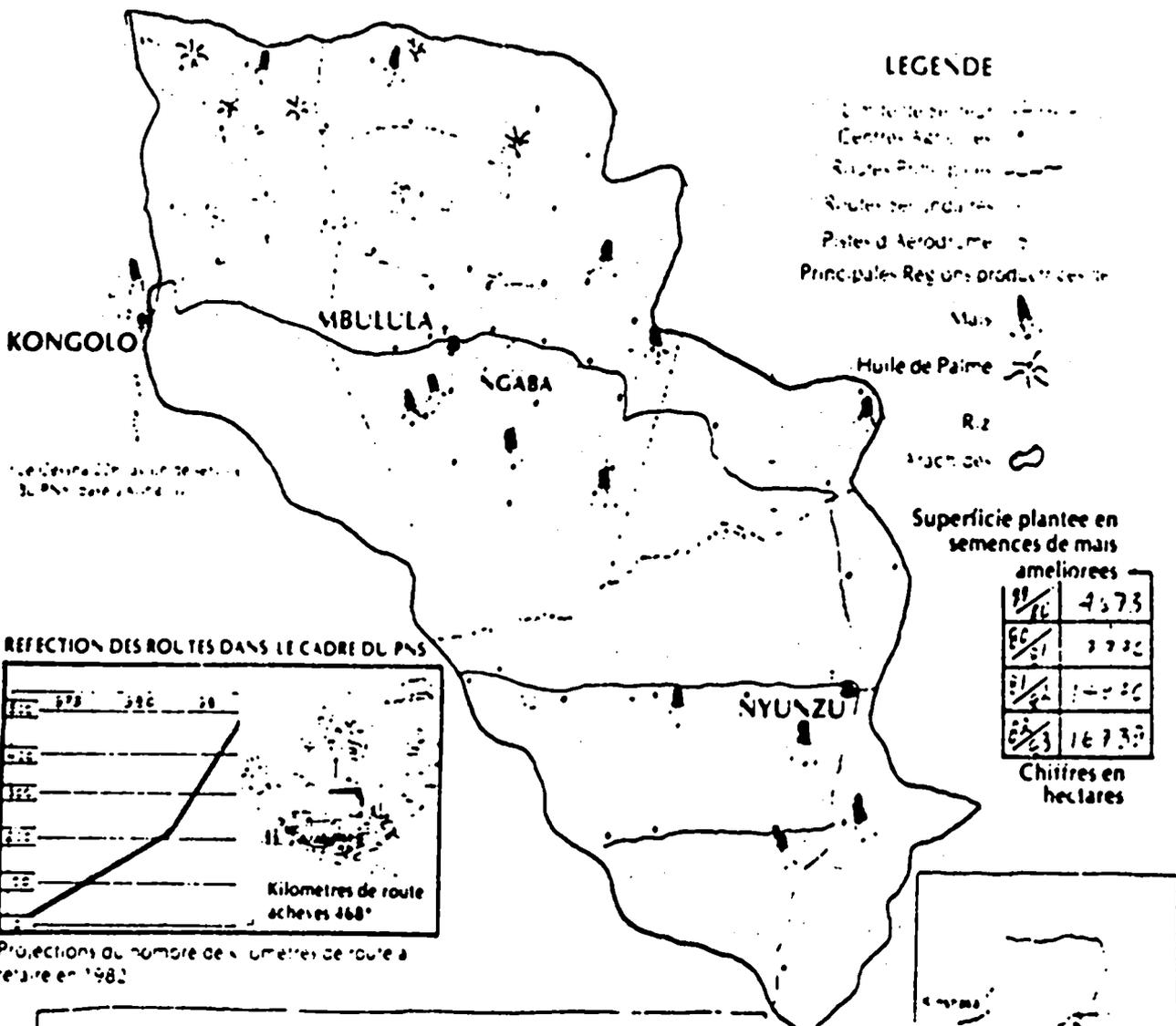
1. Country: Zaire
2. Project Number: 660-0105
3. Project Title: Central Shaba Agricultural Development
4. Project Purpose: To increase the production of corn in Shaba, relying to the extent practicable on private sector interests mobilized to induce and support small cultivator productivity.
5. Project Grant Agreement Date: 08/29/86
6. Initial Obligation Date: FY 86, 4th quarter
7. Final Obligation Date: FY 91
8. Project Assistance Completion Date: 09/30/93
9. Anticipated Project Costs and Funding Sources:

Project Costs
(US\$000 or equivalent)

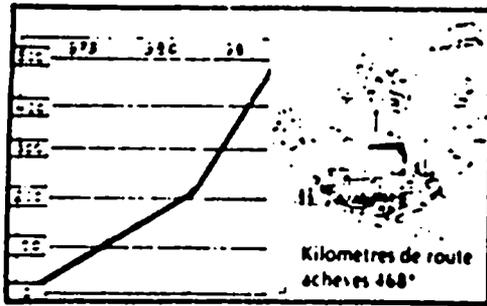
<u>Funding Sources:</u>	<u>Foreign Exchange</u>	<u>Local Currency</u>	<u>Total</u>
AID (grant)	33,900		33,900
Peace Corps	800		800
 GOZ			
Counterpart Funds		16,363	16,363
Other		8,050	8,050
Total	34,700	24,413	59,113

10. Exchange Rate: 1986
 (av): US \$ 1 = Z 60
 1987 (av): US \$ 1 = Z112
 1988 (av): US \$ 1 = Z200

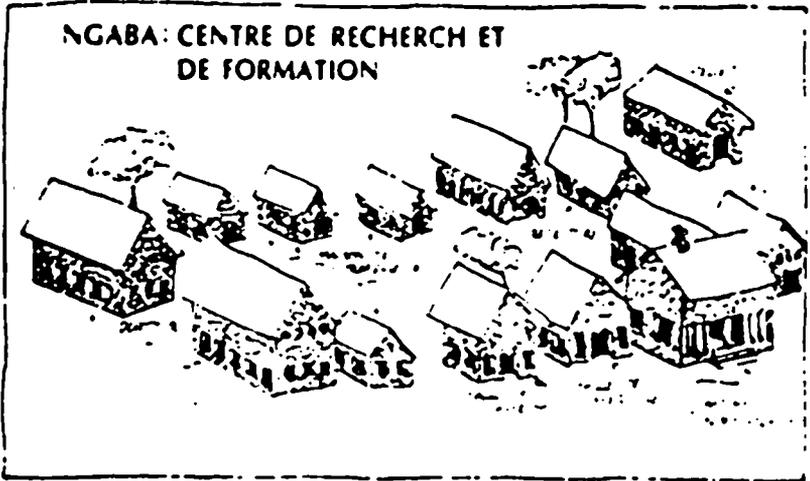
PROJET NORD SHABA



REFECTION DES ROUTES DANS LE CADRE DU PNS



* Projections du nombre de kilometres de route a achever en 1982



LIST OF ABBREVIATIONS

AID	- Agency for International Development
BUNASEM	- Bureau National Semencier
CAP	- Coordination des Activites du Projet
CPF	- Counterpart funds
COP	- Chief of Party
CY	- Calendar year
DOA	- Department of Agriculture-GOZ
DOP	- Department of Plan
FY	- Fiscal Year
GOZ	- Government of Zaire
IBRD	- International Bank for Reconstruction and Development
ha	- Hectare
km	- Kilometer
LOP	- Life of Project
OR	- Office des Routes
PACD	- Project Activity completion date
PCV	- Peace Corps Volunteer
PIL	- Project implementation letter
PNM	- Programme National Mais
PNS	- Projet Nord Shaba
PP	- Project Paper
PSC	- Personal Services Contractor
PRONAM	- Programme National Manioc
PVO	- Private Voluntary Organization
RAV	- Projet de Recherche Agronomique Appliquee et Vulgarisation
SCAD	- Service de Collecte et d'Analyse des Donnees
SEP	- Service Etudes et Planification, Departement de l'Agriculture
SHADO	- Shaba Area Development Office
SLAA	- Service de Logistique, Administration et Audit
SNCZ	- Societe Nationale des Chemins de Fer du Zaire
SNRDA	- Societe Nationale des Routes de Desserte Agricole
SGMTP	- Service de Gestion du Materiel de Travaux Publics (Office des Routes)
SVA	- Service de Vulgarisation Agricole
TMS	- Trabeza Mbeko Shaba
TP	- Travaux Publics
USAID	- AID mission in Kinshasa

1. THE SCOPE OF THE EVALUATION

- 1.01. The Central Shaba Agricultural Development Project (660-0105) was initiated in August 1986. It was planned as a seven-year project, with the Project Assistance completion Date (PACD) scheduled for September 30, 1993. It is anticipated that at that time a follow-on project will be implemented which will constitute the second phase of an overall fifteen-year effort.
- 1.02. This evaluation, which was conducted in November 1988, represents the first external evaluation of the project. This evaluation is defined as a Start-Up Evaluation which is designed not to measure project impact to date, but is intended to perform the following tasks: (1) to assess the present and possible future validity of assumptions underlying the design of the project and to recommend solutions to any problems which have arisen as a result of design misassumptions or changed circumstances; (2) to assess the appropriateness and effectiveness of project management systems and staffing, and to determine whether these can ensure the timely execution of project activities; (3) to assess progress to date towards the achievement of the project purpose, goals, and intended outputs, and to compare this progress with the planned rate of project implementation; and (4) to identify major constraints to timely and effective project implementation and to recommend any necessary changes in project strategy, logframe, inputs, outputs, financing, staffing, and implementation timetable and procedures.
- 1.03. This evaluation was performed by a four-person team of external evaluators who spent an average of 4.5 weeks in country, including 2.5 weeks in the project area (central and southern Shaba). In addition, the private sector sub-contractor for the seed component was interviewed at its headquarters in Zimbabwe.

2. THE PROJECT CONTEXT

- 2.01. Zaire's land area encompasses 2.4 million km², approximately 25% of the area of the United States. Agriculturalists generally believe that Zaire possesses considerable unrealized potential for increased and diversified agricultural production, due in part to the wide variations in agroclimatic conditions within the country, the abundant rainfall (an average of 1000-1400mm in the savannah regions and 1800-2000mm in the mountains and river basins), and the plentiful surface water resources. However, presently only 4% of the land suitable for agriculture is actually cultivated.

Approximately 60% of agricultural output is produced by traditional farmers using hand tools and labor intensive techniques; chemical fertilizers, other chemical inputs, and improved seed varieties are rarely used. Although literacy rates are relatively high (over 55% nationwide), rural incomes are extremely low the latest available data (1983) indicates that the per capita rural income level is approximately US\$100. The principal staple food crops include manioc and corn, as well as plantains, peanuts, rice, beans, and sweet potatoes.

- 2.02. One of the principal priorities of the 1986 Government of Zaire (GOZ) Five Year Development Plan was the achievement of national self-sufficiency in food crops by 1990. Among the measures which were identified as essential for the realization of this objective were the expansion and rehabilitation of the rural roads system, increased private sector participation in the distribution of agricultural inputs, intensified agricultural research activities and the expansion of rural crop storage capacity.
- 2.03. The current Regional Economic Development Plan for Shaba seeks to support national development objectives through the achievement of regional self-sufficiency in staple food crops, particularly corn. To attain this goal, the Regional Plan stresses the necessity of improving the regional road network and transport system, as well as strengthening basic infrastructure in rural market towns.
- 2.04. According to World Bank (IBRD) estimates, in 1986 corn production in Shaba totalled 320,000 tons (44% of the national total) as compared to a regional consumption level of approximately 472,000 tons. Thus, the estimated shortfall for corn and corn products in the Shaba region in 1986 was approximately 152,000 tons. Recent projections of expected regional production and demand increases through 1998 indicate that by that time the shortfall will decrease somewhat but still remain considerable (over 100,000 tons) (Ariza-Nino et al, 1987).

3. PROJECT GOAL AND PURPOSE

- 3.01. The overall project goal, as stated in the Project Paper (PP), is to assist the GOZ to achieve the goal of "self-sufficiency in staple food crops, particularly corn, for the Shaba and Kasai-Oriental regions..." (p.8) Subsequently the project purpose is outlined as follows:

To increase the production of corn in Shaba relying to the extent practicable on private sector interests mobilized to induce and support small cultivator productivity (p.8).

Finally, the objectives of the project are summarized as aiming "to move the region towards food self-sufficiency by increasing the production, processing, and marketing of basic food crops" (p.9).

- 3.02. The means through which the project goal and purpose are to be achieved include the following: (1) the provision of extension support, storage facilities, feeder roads, and improved seeds to farmers; (2) the provision of physical and institutional infrastructure to support private sector activities in the storage, processing, and marketing of agricultural produce; and (3) the creation of opportunities for the participation of local entrepreneurs and non-profit organizations in stimulating and sustaining food crop production.
- 3.03. The principal beneficiaries of the project are expected to be the small farmers of central Shaba and the corn consuming rural population of Shaba, as well as urban and rural corn consumers in the Kasai region.
- 3.04. Due to the apparently contradictory statements in the PP concerning the crop focus of the project, some uncertainty has arisen concerning whether the project, particularly the extension and seed components, is supposed to focus only on corn or primarily on corn. Further, if crops other than corn are officially included, agreement should be reached among project managers on the percentage of project resources and effort to be allocated to these crops.
- 3.05. Although the PP explicitly states that the provision of food crops, especially corn, to the Kasai region is a basic goal of the project, the present interdiction on corn shipments to the Kasai region is inhibiting the project from achieving this goal.
- 3.06. Recommendations
1. The crop focus of the project should be clarified. If crops other than corn are to be officially included, consideration must be given to the level of effort to be expended on these crops, additional resources or training which might be needed by the extension service, the provision of seed/cuttings (presently produced by the extension service), project target levels for the

production of these crops, and the expected markets and marketing requirements for these crops.

2. USAID Mission management should exert every effort to assure that the current restrictions on corn shipments from the project area are removed immediately and do not reoccur in the future.

4. PROJECT ORGANIZATION AND MANAGEMENT

4.01. Overall Project Management

Project activities are organized into three separate components, including the agriculture component (extension, storage, and the information office), the seed component, and the roads component. The responsibility for overall project management, including the coordination and integration of the activities of the three components, is assigned to the Project Coordinating Committee (Comité de Coordination du Projet, CCP). Committee members include senior officials of the organizations responsible for policy guidance to and approval of the activities of the three components, as well as for the implementation of the agriculture and roads components; these include representatives of the national and Shaba regional offices of the Department of Agriculture, the Department of Plan, and the Roads Bureau, as well as representatives of USAID. Officials of the organization implementing the seed component, the private sector seed company were invited to participate in the first Committee meeting but not to serve as official Committee members.

- 4.02. Because the CCP is scheduled to meet only twice a year, it cannot provide the coordination and guidance necessary to the project on a day-to-day basis. This role has been assumed by the unit for the Coordination of Project Activities (Coordination des Activités du Projet, CAP), a two-person team which includes the Coordinator of CCP (a senior Department of Agriculture official) and the USAID Field Project Officer for the agriculture component. Although formally assigned to coordinate, monitor, and advise on the agriculture activities, CAP also provides informal advisory support to the manager of both the roads and seed component, thereby serving as an informal operational Chief of Party for the overall project.

- 4.03. The USAID member of CAP also serves as Area Development Officer for USAID's regional office for Shaba (Shaba Area Development Office, SHADO). While it was originally anticipated that he would allocate only 40% of his time

to SHADO responsibilities, in fact the volume of SHADO work requires 75% of his time.

- 4.04. An organization chart outlining the structure of project management is presented in Exhibit I, Annex I; Annex I also provides further details on the structure and functioning of the project's management system.
- 4.05. The Management of Project Components
- The activities of the three project components are managed by three discrete organizational structures, each of which operates in a largely autonomous and distinct manner.
- 4.06. The Seed Component. The seed activities are managed by a private company, TRABEZA, which has established a subsidiary (Trabeza Mbeko Shaba, TMS) to implement seed production and distribution operations for the project area and other markets. CCP and CAP are not directly involved in monitoring or guiding the activities of TMS, although CAP members and project area managers often provide advice and support to the company. The only formal management control mechanism which exists between the project and TMS is the performance-based payment system, whereby TMS receives five annual payments based on the volume of seed marketed in the project area. Further details on the management of TMS and its relationship to the overall project are provided in Section 8 and Annex 4.
- 4.07. The Roads Component. The road rehabilitation and maintenance activities are managed directly by the GOZ Office des Routes, with the guidance and support of a USAID field project officer and several technical and management advisors located in Kinshasa, Lubumbashi, and in the project area. Further details on the management of the roads component are provided in Section 9 and Annex 5.
- 4.08. The Agriculture Component. Unlike the seed and road components, the agriculture component is managed directly by project personnel. As noted in para. 4.02, daily management responsibilities are shared by the two members of CAP. They direct the operations of the three separate units within the component, which include: (1) Service de Logistique, Administration, et Audit (SLAA), which handles financial management, personnel, procurement, and logistical support; (2) Service de Vulgarisation Agricole (SVA), the extension service; and (3) Service de Collecte et d'Analyse des Données (SCAD), which has not yet been staffed.

- 4.09. Extremely detailed and explicit management systems concerning the operations of SLAA and SVA have been installed and appear to be functioning effectively. Oversight within the units, between CAP and the units, and between CAP/SLAA and SVA, is quite intense but does not appear to be burdensome or dysfunctional. Although the SVA field personnel operate with considerable discretion and autonomy in technical matters, extremely tight control is maintained by SLAA/CAP in matters pertaining to financial expenditures, personnel, and equipment procurement and use. However despite this considerable centralization of authority, the management systems appear to be functioning smoothly, and the management errors of the North Shaba project are clearly being avoided.
- 4.10. Further details concerning the structure and management of the extension system are provided in Section 5 and Annex 2.
- 4.11. USAID Oversight
- The quantity and quality of USAID oversight for the project are impressive. USAID project managers at various levels show comprehensive knowledge of the details of the operations and a strong commitment to the project's success. The evaluation schedule is extremely intense (external management evaluations every 12 months and 2 comprehensive evaluations during the project). This intensity appears appropriate given the problems of the predecessor North Shaba project, but care should be taken not to unnecessarily impede project progress with the frequent evaluations.
- 4.12. There appear to be weaknesses in the USAID procurement system -- apparently there have been lengthy (one to two year) delays in the procurement of some vital items for both the roads and the agricultural component. The system should be reviewed, constraints identified, and actions taken to streamline the system and assure more rapid response to procurement requests.
- 4.13. The number of visitors to the project field office and to the project area offices needs to be more carefully controlled. Although some visits are indeed essential to project oversight, care should be taken not to burden project officers with other unnecessary visitors and observers; the latter not only absorb professional time and project resources but also can impose an

inappropriate personal financial burden on the field personnel.

4.14. Recommendations

1. The amount of time which the 105/AG Field Project Officer allocates to SHADO responsibilities should be limited and his SHADO duties reduced so as to enable him to devote an appropriate amount of time to his 105 responsibilities.
2. USAID/Kinshasa procurement support systems should be improved so as to assure a reasonably timely response to project needs.
3. The number of USAID, AID/Washington and other visitors to the project field office and the project area should be carefully controlled and restricted to only the most essential personnel.
4. SLAA should be fully computerized; computer training and support should be provided immediately, and additional computers obtained if necessary.
5. The General Manager of TMS should be regularly invited to participate in CCP meetings.

5. THE AGRICULTURAL EXTENSION SYSTEM

5.01. Project Goals: Monocropping or Multicropping

According to the PP, the main goal and purpose of the Central Shaba Project are to promote self-sufficiency in corn and other staple food crops, and to increase marketable production. However, a major shift towards diversification has taken place as corn is mostly a cash crop, rarely consumed in the project area because it is difficult to process by hand-pounding, and village level milling capacities are lacking. On the other hand, manioc is the staple crop and could not be neglected in a food self-sufficiency effort. To satisfy farmer's demands, other crops have been included in the technical package, including peanut, and rice, which is a traditional crop in the Kabalo region. An effort is also being made to promote soya bean cultivation because of its nutritional potential, and positive effect on soil fertility.

5.02. Description of the Extension System

In this initial stage of innovation, the technical package has purposely been designed and kept simple. It includes the following elements:

- Improved seeds (improved cuttings for manioc)
- Timely sowing
- Row planting
- Increased density of planting
- Weeding
- Timing of harvest

Through location-specific research, this basic technical package is adapted to the different ecological sub-regions of Central Shaba.

5.03 The 105 extension service (Service de Vulgarisation Agricole, SVA) has its headquarters at the Niembo station. It is headed by a Zairian Director with an expatriate advisor. The project area has been divided in three extension zones: Kabalo, Kabongo, and Malemba/Kikondja. Each zone is headed by a Zairian extensionist with an expatriate technical advisor. Each zone is broken down further into extension centers. There are a total of 14 centers.

5.04. In compliance with the PP guidelines, the SVA is independent from the Zairian Department of Agriculture extension system as far as personnel and financial management are concerned. Extensionists are hired directly by the project and receive a monthly payment equivalent to civil service salaries, to which a USAID-approved supplement which varies according to performance is added. One of the goals that SVA has set itself is to limit the number of extension agents. At present, there are a total of 30 agents with 25 agents active in the field including 2 women. SVA has set a target of a total of 40 agents, including 5 women, as the maximum number of staff for the first 7-year phase of the project. Two PCVs are now working as extension agents; this total will be increased to 16 PCVs. SVA has requested that half of the volunteers be women.

5.05. The extension methodology developed by SVA is an innovative form of the Training and Visit System. It is based on systematic and scheduled contacts between three levels of extension, each targeted to a limited and specific group. On the first level, each extension agent is based in a village from which he selects a total of thirty to thirty-five contact farmers in a dozen surrounding villages. He visits, trains and supervises these farmers regularly, about once every two weeks during the major agricultural operations. The second level of extension carries the technical message from the contact farmer to a group of 6-8 other farmers whom he/she selects among his/her neighbors or relatives. The third level of extension links the SVA with the general farming

population. This effort centers on the organization of Agricultural Field Days which are held in different villages approximately once during each major cultivation operation. A field day provides general information about agricultural innovations to a group of about 10 farmers. The brunt of the extension effort lies on the utilization of demonstration fields as outreach and teaching tools. These fields show the results of traditional versus recommended practices. SVA also collaborates with some missions and schools in its outreach effort, and will soon begin work with existing cooperatives (officially these groups are called pre-cooperatives as they have not gone through the legal steps required by the GOZ to reach the cooperative status).

5.06. Selection, Training and Supervision of Extension Workers

Most of the extension agents hired by the project have had some degree of technical training in agricultural high schools. To select candidates, SVA uses questionnaires, interviews and written exams. The candidates then receive two months of training in Niembo before they are assigned to the field. Twice a year, they return to Niembo for a week to 10 days for skill upgrading, evaluation and programming of activities for the following agricultural season. The agents are supervised on the job through spot checks. The two PCVs working with SVA have followed the same training program as other extension agents.

5.07. Results

A comparison of the PP implementation plan with the activities developed by SVA shows that the agricultural extension component of project 105 is about one year ahead of schedule, and actually exceeds targets set for year 3 of the project on some items. This is the case for the number of villages worked with, which was set at 210 for year 3 in the PP, and has reached a total of 250 at present. The number of contact farmers set at 420 in the PP for year 3 has actually been doubled and now reaches a total of 869 contact farmers, including 142 women. At present, contact farmers have set up a total of 259 demonstration fields. Extensionists have organized 399 field days which were attended by a total of 2,236 farmers. Because of the data void caused by the absence of the information office, there is no production data available concerning the area under improved cultivation for corn or other crops.

5.08. The technical package offered by SVA seems to be well accepted by recipients. Improved seeds are most readily adopted at present, and the demand for them is difficult to satisfy. The advantages of row planting and higher plant density are well understood. The benefit of weeding is also known, but its application on farmer's own fields depend on the availability of labor. SVA extensionists have developed an excellent rapport with

the farming population, and contact farmers seem to enjoy the prestige of getting so much attention from SVA personnel.

5.09. In compliance with recommendations set forth in a USAID sponsored study on the Integration of women in the 105 project (Russel 1988), SVA has made a laudable effort to improve the project outreach to women. More women contact farmers were selected, two women extension agents were trained, and SVA is looking for a female Zairian sociologist to staff the WID office in Niembo with the task of advising SVA on how to work with women, as well as identifying women's groups with which the project could work. An effort has also been made to encourage and teach male extension agents how to work with women.

5.10. Reasons for Present Level of Achievement

One factor which explains the present level of achievement of the agricultural component of 105 is that SVA was able to build its approach on the experience of PNS. PNS extension was based a standard Training and Visit system. It relied on a large staff which reached a maximum of 80 extensionists to cover an area of about one third the size of 105's project zone. This approach was very costly, such a large staff was difficult to manage, and the system appears to have broken down when the funding ended. From PNS experience, SVA has also learned to address the needs of women in the mainstream of the extension program.

5.11. Among the present SVA staff, 9 Zairian extension agents and two expatriate technical advisors transferred directly from PNS to 105. Thus SVA was able to avoid the usual delays of project start up. However, the over-riding factor which lies at the base of the impressive achievements of SVA is the competence, dedication and enthusiasm of both expatriate and Zairian staff in spite of the difficult working and living conditions of the project zone.

5.12. Problems and Constraints in Light of PP Assumptions

SVA is so much ahead of schedule that, at present, support activities are not following the pace. Such is the case for adaptive research, which the PP assumed would be the responsibility of the Applied Agricultural Research and Outreach Project (660-0091, RAV). The seed farm of Trabeza is not fully operational. The village grain storage component has not started since its appropriateness is questioned in light of the fact that the bulk of harvested corn is picked up by traders directly from the fields, and because grain storage problems seem to be much more intense at the railhead than at the village level. The lack of production and baseline data hinders SVA from evaluating extension results. The deteriorated state of the roads and the present harvest evacuation difficulties, due to poor

railroad performance, may discourage farmers from increasing production.

5.13. To fill in the gaps, SVA extensionists have had to set up trial fields, multiply seeds for crops other than corn, and participate in seed distribution. The adaptive research is conducted in Niembo and also on farmers fields throughout the project zone. Not only does this add on to the already heavy workload of extension agents, but it is a source of confusion as farmers are supposed to perceive the difference between demonstration fields and trial, validation, seed multiplication and observation fields which are often located close to, or sometimes even adjacent to one another.

5.14. One of the constraints relating to the expansion of women's participation in the SVA program is tied to the difficulty of recruiting female extension agents who are willing or able to allocate sufficient time apart from their family responsibilities, and to work, live, and travel in remote areas away from home. Furthermore, women's participation as contact farmers and recipients of training is limited by the heavy daily workload of Zairian rural women.

5.15. Sustainability of the Extension Effort

According to the PP, the sustainability of the extension effort will rest on the capacity of SVA to assist local PVOs in developing capacities to deliver extension services to their constituents. It further assumes that

local institutions such as missions will be able to assure financial and managerial responsibility for SVA extensionists by the completion of the project. At present, only two missions have sizeable agricultural programs run by specialists. Most of the other missions have very limited agricultural activities, although some express interest in collaborating with project 105. Furthermore, their resources do not seem to be sufficient to finance a permanent extension staff. However, project planners feel that by the end of the second 7 year phase of the project, if adequate seed distribution services and road facilities are in place, the relative simplicity of the extension message will have gotten across to most recipients. Furthermore, other PVOs should be attracted by the development potential of the region, once the road network is improved.

5.16. Recommendations

1. The project goals, and possibly the project paper, should be amended to take into account the shift of emphasis from corn production to multicropping. An attempt should be made to revise corn production targets, set production targets for the

- other crops which have been included in the technical package, as well as to study the marketing potential for these crops.
2. Extension agents should receive basic economic training in farm level input/output analysis in order to be able to assist farmers in making management choices on the mix and rotation of crops. Short term agricultural economics expertise should be sought in this area.
 3. To alleviate the workload of SVA extensionists and allow them to concentrate on extension, RAV should take on a more active role in the location specific adaptive research. A full time RAV agronomist could be assigned to the Niembo station and a protocol should clearly define collaborative roles of RAV and SVA.
 4. Once the research/extension link with RAV is established and seed multiplication mechanisms are in place, the role of the Niembo station should be examined.
 5. To avoid confusion, demonstration fields should not be adjacent to trial and seed multiplication fields. Furthermore, a labeling system differentiating these types of fields should be adopted.
 6. In order to consolidate the technical know-how of contact farmers, SVA should consider slowing down the pace of selection of new candidates.
 7. To improve the outreach of the SVA message, the project should investigate the possibility of installing a radio transmitter which would cover the Shaba region in collaboration with the national Zairian radio. Information on agricultural topics and marketing could be relayed to farmers through this channel. SVA could also record and distribute cassette tapes on these topics.
 8. Outreach efforts through local institutions and PVO's such as missions, cooperatives and schools should also be stepped up.
 9. To respond to women's expressed needs and promote the consumption of corn as a staple crop, the development of village level milling capacity should be investigated. Short term expertise on appropriate technology as well as village or cooperative level credit should be provided. Local currency for this type of operation might be available through the Private Sector Support Project.
 10. SVA should continue its policy of hiring and training local women who have had some schooling as assistants to extension agents.
 11. USAID/Washington should devote one of its special case study publications to the agricultural component of project 105 as its achievements could constitute a source of inspiration for other agricultural extension efforts in Africa.

6. THE INFORMATION OFFICE

6.01. Role and Direction of SCAD

According to the PP, the role of the Information office (Service de Collecte et d'Analyse des Données SCAD), will be to carry out various data collection and analysis activities required for the monitoring and evaluation of project impact. The strategy to be implemented by SCAD was to conduct a variety of focused, small scale studies and surveys rather than broad, comprehensive surveys. The implementation schedule called for the arrival of an expatriate Senior Research Specialist to head SCAD in September of 1988.

6.02 As of December 1988, the Research Specialist has not been recruited and SCAD is not operational. However, several attempts to define a scope of work for SCAD have been made: an Information plan (Herman and Chew 1986), and a Research Agenda (Rassas and Chew 1988). Although these documents were useful in identifying the types of information that would be of general interest for the different components of the project, they were lacking an implementation strategy that would allow SCAD to prioritize information needs, as well as address the critical issue of timeliness of data production. More recently, USAID/Kinshasa (Daniell 1988) drafted a scope of work for SCAD. With a more realistic and focused approach, it attempts to prioritize information needs.

6.03. As far as local staff is concerned, the PP proposed the recruitment of 2 Zairian nationals with M.A. level degrees in research methods, and GOZ seconded staff from Plan or Agriculture. Later, the idea of secondment was dropped as it would have amounted to institution building which is contrary to the private sector approach of project implementation. At present, no Zairians have been hired or singled out to work with SCAD. However, a certain consensus has developed on the size, location, and possible staffing sources of SCAD. Present plans envision SCAD as a small manageable unit with a permanent staff of 4 or 5 individuals based in the field (Kime), rather than in Lubumbashi as was planned in the PP. When needed, it will contract out to local or outside expertise for particular studies. Possible sources of local staffing are the sociology department of the University of Lubumbashi and the Institut National des Statistiques. Enumerators can also be hired on a temporary basis in the project area among teachers or students on vacation. Collaborative links could be developed with other data gathering agencies such as SEP (the data analysis and planning unit of the Ministry of Agriculture), or the UNDP/FAO-ZAI/84/008 data collection project.

6.04. Present Level of Information

At present, no system is in place to monitor crop production, marketing, or transport, or farmer incomes. However a few studies provide some baseline data on these items. A study of market prospects for corn (Ariza-Nino 1986) provides baseline data on corn prices and trade in the Central Shaba region. Corn marketing data was also collected in the project zone railheads from SNCZ statistics (Mwenge 1987). A baseline survey on commercial activity in the project zone (Appleby 1987) measured development indicators. A demographic study (Verhulst 1987) of 40 villages in the Kabondo Dianda area focused on the development of a methodology to gather and analyze population data in the project zone. Furthermore, USAID/Kinshasa is planning to process the 1984 census data for the 105 project zone.

6.05. Potential Difficulties

The North Shaba Project (PNS) had an information system whose performance never reached expectations. Its shortcomings can be instructive for project 105's SCAD as pitfalls to avoid. According to a PNS evaluation (Rosenthal et al. 1985), the design of the PNS information system was over-ambitious in scope, considering the amount and variety of data to be collected, and the level of experience of local staff. The same evaluators found that the information subsystem had insufficient formal guidelines to treat information requests emanating from project, or other sources, which caused it to disperse its efforts. Lastly, the validity of the data presented by the information system was sometimes questionable.

6.06. Recommendations

1. The difficulties encountered by the present evaluation in assessing the initial impact of project activities is an indication of the urgency with which SCAD should become operational.
2. Based on progress of the agricultural extension component of the project, priority should be given to the immediate gathering of agricultural production and marketing data.
3. If SCAD is to fill its mission of providing information as a guide to decision making, the criterion of timely data production should be an important factor in determining the type and scope of surveys to be conducted.
4. All baseline studies mentioned above should be replicated periodically (every two or three years), as they will be the only source of data available to which project impact can be compared to identify trends.

5. All project components, in coordination with the development of a DFA program impact evaluation system, should have an input in the preparation of SCAD's workplan. Once this workplan is finalized and approved by all parties involved, care should be taken not to divert SCAD from its track.

7. CROP STORAGE FACILITIES

7.01. The Crop Marketing System

The majority of the corn crop is commercialized through large private merchants living in villages generally located near the rail line, or next to the national road system (in the south of the 105 project area). The government also tries to control the number of merchants by issuing trading licenses. Most of the merchants in the project area have delivery agreements with large millers such as Gecamines and Tarica. However for the Kasai traders, the millers make credit available according to the quantity of corn which the traders expect to purchase. Some millers also provide the merchants with truck spare parts and sacks for the corn.

7.02. The trading season normally starts in late April-May, and by December 85-90% of the crop is delivered to the mills. The merchants normally own several large trucks or pick-ups but due to subsidized SNCZ rates for agricultural produce and bad road conditions, almost all long-distance transport is done by rail.

7.03. Because of their limited storage capacity, traders normally buy according to expected rail wagon availability. The usual contracts between merchants and millers generally presume a 70% payment when the crop is loaded onto the rail wagons. This appears to be the primary reason for the frequent time-lag between crop maturity and date of harvest. Since farmers do not normally start harvesting until the merchant supplies the sacks (i.e. agrees to buy the crop), the effect of the limited and inappropriate storage facilities accessible to the merchants directly contributes to crop spoilage in the fields.

7.04. Although marketing margins are very high, trading corn in Shaba is probably as stressful and risky as being a broker on the New York Stock Exchange. Fuel supplies, communications and transport problems, SNCZ inefficiency, and government intervention (such as the October 1988 interdiction of corn shipments to Kasai) make business extremely difficult. The commitment of merchants to invest in major infrastructure such as storage facilities is clearly affected by their greater confidence in other much more attractive and less risky business opportunities.

7.05. Estimated Crop Losses

A. Losses in the Field

The losses experienced in the field, especially the post-maturity losses, are undoubtedly by far the most important. The PP estimated that approximately 30% of the annual crop is lost in the field before harvesting. Increasing production, keeping on-farm consumption constant, without installing adequate storage will certainly result in even higher losses if the beginning of the marketing season is not changed to an earlier date. The growing season for the varieties used is approximately 120 days and the normal rainy season lasts 4 1/2 to 6 months. Crops are generally planted at the start of the rainy season, since a delay in planting date results in large yield reductions. Therefore, most of the crop normally stands (or better falls) up to 2 months in the rain before being harvested. (Farmers will probably only harvest the small quantity needed for household consumption before the end of the rains).

B. Losses from Farmer to Rail

In 1988 crop losses at the railhead have been considerably higher than in previous years due to the lack of availability of locomotives and rail wagons and the lack of railhead storage facilities. Due to heavy insect infestation, crop quality has gravely deteriorated.

C. Losses on Rail and in Mill Warehouses

According to a major grain trader, corn weight loss on rail is limited. However the more time the crop is exposed to insect pressure, the more the quality suffers. Thus delays in transit and in delivery to the mills further contributes to crop deterioration

7.06. The Need for Storage at the Farm Level

The PP envisaged the installation of 72 village storage centers similar to the 4 village storage facilities financed under PNS. However the PNS facilities, which have a capacity of 18 tons, were apparently under-utilized or unutilized because of farmer resistance to joint storage of their crops. Further, the facilities are unnecessarily sophisticated and costly (\$2-4,000 in the mid 1980's; the current cost is not known).

7.07. Project personnel at Niembo have been experimenting with an improved version of the traditional farm family storage units, built entirely with materials available for free, or at low cost, in rural areas. This type of facility appears to be much more appropriate (technically, socially, and financially) for farmer needs and desires.

7.08. SVA managers have requested that during FY 89, a storage consultancy be scheduled to examine the need for farm and village-based storage facilities, and to advise on facility design. Because of the clear and pressing need for these facilities, the evaluators endorse this plan, and recommend that the consultancy be scheduled in the near future in order to allow for implementation of any recommendations before the 1989 harvest.

7.09. The Need for Railhead Storage

A simple and low-cost railhead storage system consisting of a covered raised platform would reduce corn quality and quantity losses considerably at the level of the railheads. The GOZ Project Coordinator has suggested that a system of covered bulking centers be located at 10 railroad stations in the principal corn producing areas; the total capacity of this system would be 16,000 MT. In addition, it was suggested that uncovered storage platforms be installed at 3 additional stations; the capacity of these facilities would be 3,500 MT. This system could be quickly installed and easily maintained. Given the urgency of the need for railhead storage and the simplicity and low cost of this system, we recommend that these suggestions be seriously considered in the immediate future.

7.10. Conclusions

The crop marketing system was not sufficiently analyzed in the project paper. The effect of increased corn production and the possible effect of other crop production on the trading system needs to be analyzed. The production increase in the PNS area does not appear to have resulted in an increased number of traders, i.e. more competition, better prices for the farmer, and better quality for the miller. However improving quality and reducing losses might eventually result in better corn prices for the farmer. Thus, setting up a railhead storage system would contribute to 105's production increase goals by improving the business confidence of traders, reducing crop losses and spoilage at the railheads, and reducing losses in the fields by allowing an earlier start of the trading season.

7.11. Recommendation

A consultancy to investigate the design of appropriate farm-level storage facilities, as well as the design, location, ownership, and management of railhead storage centers, should be scheduled in the immediate future. The installations of the railhead storage facilities should be initiated as soon as possible, in order to assure that the system will be in place before the 1989 harvest.

8. THE SEED COMPONENT

8.01. Management and Organization of Trabeza Mbeko Shaba (TMS)

Trabeza, a diversified company which concentrates mainly on the fabrication of rail ties and owns a hotel in Lubumbashi, started to produce corn in 1980. Their first experience with seed corn dates back to 1986. This season around 780 MT of seed corn are produced in Fungurume (mainly Shaba I plus 15 MT of Kasai I and 15 MT of a 3-Way hybrid) for the southern Shaba market, plus 40 MT in Niembo for the project area.

The General Manager, Mr. Couttenier, is assisted by his two sons; one is a Belgian-trained agronomist who is responsible for the seed production in Fungurume; another son supervised the sales and distribution in the 105 area the past season. Both have very little technical experience in the seed business. Mr. Wacquier, a shareholder of TMS, is in charge of finance and accounting. Additional staffing is planned; the third Couttenier son will finish an MBA in Belgium and assist in general management, and an Uruguyan agronomist is probably joining the TMS staff to develop a rudimentary testing program and quality control lab.

No budgets or action plans were available. The most obvious concern is the lack of practical experience in the seed production and marketing sector.

A contract with Bunasem was recently signed to assist TMS in equipment purchasing and quality control lab. Although the town of Fungurume offers an ideal location for the production of seeds, the processing equipment recommended by Bunasem is far too sophisticated and expensive for the needs of central Shaba farmers. The new quality control lab is operational but inadequately staffed. Due to its distance from the project area (670 km to Niembo about 14 hours by road) market and its high production costs, we do not see Fungurume as a viable seed production center for the target market.

8.02. Major Constraints of the 1988 Sales Season

- The contract with USAID was signed in April 1988, which was later than anticipated, delaying the start of the season and forcing TMS to purchase rather than produce seed for project market.
- The key person selected for seed distribution was the contact farmer; since no monetary incentive was given this turned out to be a major weakness in the distribution system.

- SNC2 rolling stock shortages affected last years crop marketing and farmers confidence in maize as a cash crop, so their interest in spending cash for seed was limited.
- TMS planned to sell on a barter deal first, but had to switch to cash. Farmers found 60Z/kg a high price. (Barter base was 3 commercial for 1 part of seed; 60Z/kg is about 4-6 x commercial price).
- No target markets were identified because no collaboration with 105 extension took place to organize the sales season, so seed was distributed throughout the area, causing excessive transport costs.

8.03. Experience/Lessons Learned from the 1988 Season

- Contact farmers should be paid if they are to function as seed distribution agents, but the margin is limited by the already high seed price (next season 130Z/kg).
- Future marketing strategy: six target areas have been identified for next season.
- Seed production for 105 market must take place at Niembo (to reduce the cost of production and transport) using contract growers. Fungurume can only be used as a second production center to ensure seed supply in case of production failure in Niembo. The infrastructure for processing and storing is not yet available in Niembo.
- Advertising campaign for major target areas will be started to create demand and indicate distribution points.
- Construction of 5 simple seed warehouses is planned, so that seed will be sold centrally.

8.04. Consequences

The final sales figures will only be available by December 5th, 1988. Preliminary estimates indicate that:

- The 1988 sales season resulted in a loss of Z 9.4 million (626Z/kg); however, because of the USAID start up/risk payment the final result will more likely be around Z 4.7 million (\pm US\$ 20,000).
- Transport is the biggest single cost of distribution. Collaboration with merchants using central storage is vital. SNC2, if viable, could be used to transport seed to major towns until the road system is improved.

- Seed returns/carry-over stocks have to be tightly controlled because of high inflation and seed quality problems. No solution has yet been found for this year seed return.
- Access to high quality foundation seed from Bunasem or RAV must be ensured.
- Processing equipment at Niembo has to be simple and cheap (Zimbabwe or locally made), especially in view of the limited market potential. Should Bunasem insist on highly sophisticated equipment it is impossible for TRABEZA Mbeko Shaba to produce (cost of equipment) certified seed in the project area. Quality control is probably not assured by Bunasem. Two alternatives are recommended:
 - Quality control by TMS according to ZSC instructions
 - QC by 105 staff at Niembo

8.05. Farmers' Need for Improved Seed

The 105 project area, excluding PNS open pollinated potential market size, is estimated at 130 - 213 MT. It is very likely that TMS considers the South Shaba hybrid market as its first priority. The assumption made in the project paper of 786 - 940 MT potential is not realistic. It is already extremely difficult to distribute and sell seed for a company producing in the market area. The presence of PMKO (Projet Mais Kasai Oriental), of Gecamines in Kaniama Kasese, and of Ngaba in PNS (more politically than actively involved in seed production) limits the Niembo/TMS production area to serve the 105 market. An additional important point is the presence of an active extension service which creates demand. Next year's corn price will have a major influence on farmers willingness to buy seed especially since the seed price next year has been estimated to reach as high as 130Z/kg. Economic return for farmer assuming a 40% increase in yield over farmers seed is given even at very low yield level, over 4 years farmer assumed replacement time benefit is around 20%. The seed price of 130Z/kg leaves a 15% margin to TMS, which is low compared to other countries (25 - 30%).

8.06. USAID Payment System

The USAID payment system is based on a form which is completed for each customer either by TMS or its agents. The information includes ID Number, address and quantity of seed purchased. Since the paper used is foolproofed no manipulation is possible. At the end of the season, TMS summarizes all the information and passes them on to USAID, which will then check at random to verify the information.

The amount paid, which diminishes each year, is a function of the seed quantity sold, with a maximum amount/target quantity.

The reporting system imposed by USAID is very comprehensive. We question TMS willingness/ability to accomplish the requirement since the private sector is mostly quite unfamiliar with this sort of business approach. If not simplified, the reporting system could therefore become a weak link in the USAID-TMS collaboration; we suggest that only a comprehensive annual report be required, but rather encourage a close collaboration with the 105 extension staff (coordination of activities in the field).

Funds granted under the contract to create a sales and distribution network in 105 area are considered sufficient only if the following assumptions are realistic:

- Farmers will buy 100 MT by year 4 considering the high seed price (not justified from farmers point of view before extension service demonstration plots).
- Although only easily replicable products are sold, we assume that no other company will sell seed in 105 market (ESTAGRICO or Lubudi), undercutting prices or using TMS sales and distribution system (agents).
- Bunasem will review its technological requirement, especially for equipment and seed-sizing criteria, not imposing overly-expensive machinery standards on the Niembo seed production activities.

8.07. Zimbabwe Seed Cooperative (ZSC)

ZSC is a cooperative of about 150 seed producers; all of them are large commercial farmers. No efforts are made to produce seed with small-scale farmers. Their board is all white and their business approach is still quite conservative. Their two biggest advantages are:

- Very high quality standards in production; extremely good image in surrounding countries;
- A virtual monopoly situation as a consequence of an exclusive agreement with the government, which dates back to the pre-independence government. Relations with the actual government are basically a consequence of the strategic role ZSC plays in supplying high quality seeds to the farming economy in Zimbabwe.

The ZSC research activities are primarily directed towards the needs of its members, thus developing products for the commercial sector and improving seed production techniques. Since independence, corn production has increased dramatically in the

non-commercial sector (small-scale communal land) and decreased in the commercial sector; alternative crops like cotton, soybeans and tobacco with higher return have replaced corn. This is mainly a consequence of the corn price policy adopted by the Zimbabwean government. Corn prices are as in many other countries, political prices which do not always reflect the economic reality.

ZSC's main interest in Zaire is to keep their presence in the hybrid seed corn market in South Shaba. Bunasem will apparently be limiting seed importation to increase local production. ZSC has been looking for an agent in Zaire for some time. This apparently had an influence in signing the T.A. contract with Trabeza. In other words ZSC could keep a presence in the hybrid seed market by collaborating with Trabeza, especially since Trabeza has already started to produce hybrid seed with another Zimbabwe based-company, Ciba-Geigy.

A feasibility study currently under way will clarify ZSC involvement-commitment. At this stage, the main ZSC contribution will most probably be focused at seed production technique (agronomic aspects, seed processing, quality control). ZSC's direct experience in sales and distribution in the small scale and communal land market in Zimbabwe is rather limited, since they mainly work through agents and distributors. Their main involvement is in promotion. It was also mentioned during our visit that their involvement in sales and distribution aspects in Zaire was limited by manpower.

To date, the vast majority of products sold by ZSC are government hybrids which will not be available for local production in Zaire, since legally this material belongs to the Zimbabwe government. Since the ZSC breeding program is still mainly directed at the needs of the commercial sector, it is very unlikely that an immediate product is available for the 105 project market; a crossing of ZSC X RAV material is a more realistic option, although this would not be possible before 4-5 years, for either an open pollinated or hybrid seed corn.

We strongly recommend close monitoring by USAID of the ZSC-TMS collaboration to direct it as the most urgent need of the project.

8.08. Conclusions

- The "private sector seed business" approach is an innovative aspect of the 105 project. However, it might be difficult to maintain TMS interest in the 105 market once USAID assistance is terminated because of the huge potential of the South Shaba hybrid market. (105 potential - 100 MT US\$50,000 versus 800 - 1200 MT hybrid market US\$ 800,000 - 1,200,000). In addition, distribution in the south Shaba hybrid market is much easier (infrastructure and average customer size i.e. in

the 105 project area, 0.8ha per customer; hybrid market area 15-1500ha per customer).

- The market can only be served if a very simple distribution system is implemented, i.e. central warehousing in target areas using merchants and contact farmers to serve customers. Demand has to be actively created in collaboration with 105 extension service.
- Bunasem will play a major role in setting standards for seed processing requirements, which might increase processing costs unnecessarily.
- Following a dual approach using open pollinated and hybrids specially developed for low fertility-management conditions will ensure TMS viability as a seed company after USAID funding has ended.

8.09. Recommendations

1. An action plan on how TMS plans to build up a sales and distribution system in the 105 area has to be requested by USAID; otherwise the funds might just be used to cover current expenses.
2. ZSC should submit a T.A. plan specifying their involvement in seed production and especially in assisting to create a viable marketing network in the project area.
3. TMS marketing activities/strategies should be coordinated with the project extension service. Private merchants should also be involved (where possible) in the next season's planning.
4. A market feedback system to identify farmers' needs -- real market potential -- has to be established in collaboration with extension service.
5. Create demand for improved seed so that market can be served using central warehousing. Analyse possibility of using merchants truck/pick up to transport seed when merchants collect commercial crop. Use contact farmers as farmer dealers. (This is a common practice in the U.S. and Canada). It implies careful selection and training by TMS.
6. Develop widely adapted unique product (open pollinated or hybrids) within next 4-5 years using local or local X imported germplasm to avoid me-too product situation (easily replicable). Close liaison with RAV is

essential. This approach would clearly increase the potential market (seed purchased every year).

7. Assure high quality standards by:

- Using good foundation seed (from RAV not Bunasem);
- Giving close supervision of contract growers (additional training for these farmers might be required);
- Using simple processing equipment (ZSC input);
- Monitoring carry-over stocks (costs and quality).

Collaboration and coordination with Bunasem is vital, but their equipment requirements for certification must be appropriate to the real farmer needs.

8. TMS should not diversify into other crops before their seed corn business is firmly established, although dramatic changes in corn production could affect this decision.

9. THE ROADS COMPONENT

9.01. The Need for Redesign of the Roads Component

The project has been described in detail in the Project Paper of June 30, 1986. However, since that time changes have occurred which affect the design of the roads component including:

Practical bankruptcy of the Roads Bureau due to problems associated with fuel tax collection;

The availability of considerable inputs (approximately \$7,000,000 worth of additional Japanese road construction equipment) which were not contemplated in the Project Paper;

Reincorporation of the Manono area west of the Lualaba River into the project area;

Creation of RDA in an attempt to relieve the Roads Bureau of some of the road maintenance workload;

Inability of the SNCZ to transport expeditiously agricultural surpluses generated in 1988, resulting in considerable crop spoilage;

Approximate one year delay in the link and feeder road rehabilitation program;

Inability to implement an effective maintenance program resulting in rapid deterioration of roads under the previous PNS project.

These factors dictate a redesign and reprogramming of the roads component if the project is to meet the objectives stipulated in the Project Paper.

9.02. Findings, Conclusions and Recommendations

Each of the issues relating to the roads component is considered in detail in Annexes and should be consulted for specific details. A summary of major issues considered is presented below.

9.03. Financing

A shortfall of approximately US\$5,000,000 has been estimated for the roads component due mainly to implementation delays, need for extended technical assistance, and the decision to contract part of the road network to the private sector. However, the estimate should be confirmed due to the complex interrelationships between workloads, timing, equipment available, and project duration. (Annex 5: issues I, V.)

9.04. Fuel Tax. The short and even long term possibilities of the Bureau of Roads to sustain local funding for fuels and direct salaries as required by contract is practically nil considering the large amounts of equipment which have been acquired under the project. If the roads component is to be effectively reactivated, then these costs must be assumed by USAID through counterpart funds at the rate of 100 percent until such a time the road tax problem is resolved and probably 75 percent even after new fuel taxes are imposed. (Annex issues: I, L, V.)

9.05. Roads Bureau. The Roads Bureau is currently inefficient and excessively burdened with non-productive administration. Both short and long term strategies must be implemented to streamline the organization.

Short Term: Consideration should be given to channelling Roads Bureau resources directly through a 105 project office set up for this purpose. This would be an interim measure until such a time the project was considered to be progressing satisfactorily at which time control would be returned to the Bureau.

Long Term: The ownership and operation costs of the heavy equipment acquired under the program practically preclude any possibility in the next 8 years of rendering the Roads Bureau self-sustaining. The long term policy should limit the Roads Bureau to road maintenance and minor repairs. The development of

a competitive construction industry at all levels should be encouraged to do major road rehabilitation, improvement, and reconstruction. Maximum utilization of labor-intensive road maintenance procedures should be introduced. Equipment- and labor-based road maintenance should be implemented through separate organizations. (Annex issues: L, Q.)

9.06. Project Scheduling. Time estimates for implementation in the PP appear to be exceedingly optimistic. Even with the added Japanese equipment the road rehabilitation program is estimated to require at least four additional years with an estimated early completion date of January, 1993. This would have to be confirmed by some sort of critical path analysis made considering anticipated workloads, production rates and the quantity and timing of resources made available. Even though contract rehabilitation is more expensive than force account work utilizing project equipment, the higher costs would be compensated by more early completion as project equipment could be concentrated on a smaller network length. Furthermore, some incentives to the larger, private sector contractors is desirable if the construction industry is to remain competitive. (Annex issues: A, B, H, O.)

9.07. Emergency Road Repair Program. There is considerable concern that the 1989 projected harvest will not be able to be transported to railheads due to the poor condition of the existing road network. All construction on the project should therefore be stopped, available equipment regrouped and an emergency repair program initiated with the intent to make the road network passable by truck traffic by correcting major defects which currently make these roads impassible. (Annex issue: B.)

9.08. Road Rehabilitation Program. Once the emergency repair program is completed, then equipment can be reassigned to normal road rehabilitation work. Balanced work crews having the proper equipment/labor ratios with the number of haul units adjusted to transport distance on borrow materials should be formed. Every effort should be made to provide adequate logistic support to permit crew production rates on the order of 20 kms per month for the link road and 30 kms per month on the feeder roads. This is about double current normal rates being attained. (Annex issues: B, O.)

9.09. Road Maintenance Program. The PP stipulates that the roads being rehabilitated under the program be maintained temporarily by equipment working on the road until a labor-intensive maintenance program can be implemented for permanent road maintenance. The concept is basically correct. However, two years after project startup there is no labor-intensive maintenance program even in the planning stage. The current situation on the PNS roads is a case in point as to what can happen if such a maintenance program is not initiated immediately. Ideally, labor maintenance should take over the minute the rehabilitated road is completed. A labor intensive maintenance system for project roads must be designed and implemented immediately. If this cannot be done by in-place AID

personnel, a consultant should be hired. (Annex issues: F, J, M, N, P, Q, U.)

9.10. Spare Parts Acquisition. A major constraint to effective road rehabilitation is frequent delays in the acquisition of spare parts, for which lead times currently in excess of one year are reported. The local purchase of these parts currently works well; however, large orders must be purchased abroad, which has been a major source of delay. The two obstacles identified have been the SGMTP in Lubumbashi and the A.I.D. Commodity Management Office in Kinshasa. Procurement procedures through these two entities has to be expedited. Maximum and minimum inventory controls through a Kardex or other system should be implemented at the base camps. If expatriate mechanics currently assigned to the project are not capable of doing this a consultant should be hired. (Annex issue: K.)

9.11. Capacity of the SNCZ Railroad. The current capacity of the railroad in the project area is about 25,000 tons per month which would require a six month evacuation period for the 160,000 tons of agricultural surplus projected for the program. The short-term prospects of increasing this capacity are slight. Adequate storage facilities must be constructed at the railheads and/or farmsites to permit these surpluses to be stored until rail transport is available. This storage construction program must be initiated on an emergency basis to be compatible with the emergency road repair program indicated previously if the 1989 agricultural surplus is to be effectively marketed and to preclude repetition of spoilage currently occurring with the 1988 harvest at the railheads. (Annex issue: C.)

9.12. Transport Network Distortion Due to Railroad Subsidies. Due to a GOZ subsidies freight rates for agricultural products on the railroad currently average about Z 1.5 (US\$ 0.0065) per ton-km as compared with an actual cost between Z 18.0 and Z 20.0 (US\$ 0.0782 and US\$ 0.0870) per ton-km. The current, Nov. 1988 official exchange is Z 230/ US\$. The railroad is practically forced to haul agricultural products free of charge. The truck transport rate as verified by inquiries in the project area during field visits was about Z 35.0 per ton-km or US\$ 0.152. It would appear that considering storage, loading and transfer charges associated with rail transport in addition to the fact that truck traffic is required from the farms to the railhead, a all overland truck transport system could be made feasible to the railroad if current subsidies were removed. The current improvements to the link road network plus utilization of larger long distance trucks could effectively reduce truck transport subsidies could be distorting the marketing system and the project as currently being implemented could be considered ill-conceived. A transport economist should be contracted to perform a study. (Annex issue: C.)

9.13. River Transport. The possibility of a more efficient multi-modal transport system could be implemented by the consideration of a Lualaba River link between Malemba and Bukama. The inclusion of the Manono area west of this river into the project area makes the river alternative more feasible as the truck haul distance to Malemba would be considerably less than to available railheads. This possibility should also be studied by a transport economist with the intent of recommending the most economic cost-efficient multi-modal system for the project area. (Annex issue D.)

9.14. Road Design Standards. The link road is currently being constructed as an all-weather, two lane facility while the connecting feeder road is a single lane earth road. Traffic volumes currently are probably between 5 and 10 vehicles per day on the link road and between 1 and 5 vehicles per day on the feeder roads. The design standards set for the link road as a two lane, all weather facility cannot be justified by traffic volumes. An economic evaluation based on actual and projected traffic volumes would dictate the entire road network to be constructed as a single lane, earth road and staged as required in accordance with traffic increases. If timely staging and maintenance could be assured, this would result in more efficient utilization of resources. The circumstances of the project, however, whereby all benefits are attributed to agricultural surpluses with the road system just a necessary "evil" in the marketing system, higher standards than would ordinarily be required by traffic may be justified. This issue deserves more careful evaluation by a transport economist. (Annex issue: E.)

9.15. Management Systems. Although an in-depth evaluation of existing management systems could not be made as part of this evaluation, there were obviously some missing links. Road inventories, for example, have only recently been completed by AID for the project area. There was no integrated maintenance management system in place including all the reporting, accounting and control features. Certain features of the system, however, such as calculation of equipment operation and ownership costs were in-place. A more detailed review is required to determine what systems need to be introduced with care taken to ensure applicability and preclude unwarranted sophistication. (Annex issue: Q.)

9.16. Institutional Links. There are various institutions through which an effective road maintenance program could be implemented in the project area including the recently created SNRDA, PVO, mission groups, Peace Corps, village chiefs and private contractors. Differences in population density and village frequency along the feeder and link road network will probably preclude the utilization of any one system over the entire project area. The maintenance system must be designed to make the most efficient use of these institutions be it through man/km,

village/km, permanent or mobile crews, or contract maintenance to the private sector. A system will have to be designed, implemented in the field and then adjusted as required based on results. The primary objective would be to bring the labor based maintenance system down to the village level where villagers feel they are part of the system and the roads belong to them. Road maintenance on a continuing basis can only be assured if supported at the grass root level. (Annex issue: R.)

9.17. Technical Assistance and Training. Technical assistance and training as currently conceived in the project are \$14,285,000 and \$400,000 respectively, which comprises about 43% or almost half of the entire AID participation of \$33,807,000 in the project. A lot of roads could be rehabilitated and maintained for this input. Although there is no question that some technical assistance is necessary and essential, there is a good possibility that not all the technical assistance is cost-effective and could be reoriented or decreased. (Annex issue: G.)

9.18. General Overview. The roads component as conceived has considerable potential on paper and undoubtedly would provide high rate of returns if successfully implemented. However, implementation will not be easy as there are too many factors involved, financial and otherwise, upon which implementation depends. Many of these factors are outside project control and others depend on macro implementation criteria, e.g. the road tax, which cannot be judged by project implications only. What is good for the project may not be good for the country. The general criteria in developing countries is that if something is going to work, it has to be simple. This is not a simple project. (Annex issue: S.)

LIST OF PERSONS CONTACTED AND PLACES VISITED

<u>Name</u>	<u>Position</u>
<u>KINSHASA</u>	
USAID:	
Dennis M. Chandler	Mission Director
Joseph B. Goodwin	Deputy Mission Director
John H. Bierke	Program Officer
Doug Broome	Deputy Program Officer
Stephen Vance	Evaluation Officer
Glenn Rogers	Research Officer
Donald Brown	Agriculture and Rural Development Officer
Ron Harvey	Deputy Agriculture and Rural Development Officer
Douglas Daniell	Agricultural Economist/Analyst
John McMahon	105 Project Officer
Mechell Jacob	091 " "
Richard Macken	Project Development Officer
Tom Driscoll	Project Design "
Robert Braden	Engineer
Helen Bemis	Asstistant Project Officer
Chris Trappman	World Bank Representative
Cit. Kayembe Kabeya	Head of Production BUNASEM
Mikhail Rusnic	Technical Advisor "
Bruno di Leonardo	" " "
Cit. Mukende Mubenga	Director of SEP (DOA)
David Tighe	Manager IBRD road project
Cit. Nganzobo	Office des Routes
Cit. Ambua	" "
<u>LUBUMBASHI</u>	
USAID:	
Bruce Spake	SHADO, Development Officer
David Williams	" Field Project Officer
Stephen Connoly	Pr. 105 Logis./finance
Francis Thomas	" " OR coordinator
Cit. Mansinsa Mvuala	Agric. Dept., 105-GOZ Coordinator
Cit. Nsitu Vuvu	Director OR Lubumbashi
Cit. Tshitenda Kabundji	Director OR Technical School
M. Beranger	Assistant Director SQMTP
Cit. Tsunbu Tsunbu	Reg. Representative for SNRDA
M. Stroyman	Operations Director, SNCZ
Anthony Di Gennaro	Pr. Manager, Louis Berger Int.
Alan Graff	Mechanic, " " "
John Shelp	Admin. Asst., " " "
Miles Wedeman	019/RAV Evaluation team

Jacques Denis	"	"	"
Eric Tollens	"	"	"
Gene Neill	"	"	"
Jacques Tarica	Grain trader		
Cit. Kasongo Shuyaka	Agriculture Department Regional Inspector for Shaba		
Grand Chef Kabondo-Dianda	Former teacher at Institut National des Statistiques		
Guido Verhulst	Head of Sociology Department at the Faculte des Sciences Sociales		
Cit. Vwakyanakazi Mukohya			

KONGOLO

Patrick Van Loock	105 Mechanic/Machinist
Cit. Watula	PNS Director
Cit. Kusungu	" Extension Supervisor
M. Amiro	Corn trader
P. Fotiou	" "
Bernard Boudailler	ESTAGRICO Director
Cit. Bosa	" Production Director
Prof. Louant	Faculte Sciences Agronomiques, Louvain
	Train station master

KABALO

Cit. Ngandu	SVA, Zone Supervisor
Dai Xuan Nghiem	Agronomist, Zone Technical Advisor
Cit. Ngoy Kitenge Makonde	SVA, extension agent

KADIMA

Cit. Kibawa Wa Hamba	Contact farmer
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NIEMBO

Cit. Mubwa Manwana Daddah	SVA Technical Director
Minh Nguyen	Agronomist, SVA Director Technical Advisor
Gelissa McKiernnan	APCD/Ag. Assistant Peace Corps Director
Cit. Beya	SVA, extension agent
Cit. Kabemba	School Headmaster, contact farmer
Cit. Kabange Wa Mpanga	Contact farmer

KABONGO

Cit. Bamba-di-Lelo	Commissaire de Zone
Cit. Ramazani Omene	" " Assistant
Cit. Mukanya Seba	SVA, Zone Supervisor

KIME

G. Applemans	PSC, in charge of base construction
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KAMBO

Cit. Yumba-Nshimbi-Kitunga SVA, extension agent
Robert Rosegreen Peace Corps Volunteer

KITENGE

Sefou Youssouf Corn trader
Train station master Kasai corn traders (2)

BUDI

Cit. Ngoy Kahenga SVA, Center Supervisor
Cit. Kamundu Muley Veterinarian, CAFCA

SASHI

Cit. Twite Ilunga Contact farmer
Cit. Ilunga Kilasi " "
Cit. Ngoy Wa Hamba " "
Cit. Koswe Tiwa Mato " "
Cit. Ilunga Mryunga " "

LUBINDA

Citne. Ilunga Mbidi SVA, female extension agent
Cit. Buhendwa " , Assistant Center Supervisor
Cit. Ngoy Manyasa Wa Kabila Contact Farmer
Cit. Chikala Ngoy " "

LUBONDOY

Cit. Kasengeneke Kayembe SVA, extension agent
Citne. Ilunga Banza Female contact farmer

KIKONDJA

Cit. Muteba Nyembo SVA, Zone supervisor
Jacques Bussieres Agronomist, Zone Technical Advisor

KIMASHIKA

Cit. Umba Dingwa Contact farmer

KITOBUE

Cit. Mukeya Mbedi Contact farmer
Cit. Maloba Thoma " "

KALOMBA

Cit. Kasengeneke Lukitu Bitana SVA, extension agent
Cit. Kazumba Contact farmer

KABONDO-DIANDA

Cit. Kitambala

SVA, Center Supervisor

FUNGURUME

Walter Couttenier
M. Wacquier

TRABEZA, General Manager
" Finance and Accounting Supervisor

HARARE, ZIMBABWE

Mike Norman
Pete de Villiers
Rex Tahersfield
Ian Noruann
Joe Kennedy
Willy Randby
Rob Hawlyn
Stephan Schuler
Steve Moyo
Peter Munday
Thomas Fentleman

Seed Coop., General Manager
" " Head of Production
" " Head of Research
" " G. M. of Exports
National Tested Seed, Director
" " " G.M.
Savana Seed, General Manager
CG Seed, Head Seeds Division
" " Country Manager
" " Head Agro. Division
Ministry of Agriculture, Head of Commercialization

ANNOTATED BIBLIOGRAPHY

- Allal, M., G.A. Edmonds. "Manual of the Planning of Labour-Intensive Road Construction", International Labour Office, Geneva, 1977. Guidelines for implementing labor intensive road construction procedures in developing countries.
- Appleby, Gordon. "Baseline Commercial Survey of the Central Shaba Project Area", USAID/Kinshasa 1986. Identifies and measures development indicators at the village level.
- Ariza-Nino, Edgar, M.F. Mueller, "Market Prospects for Corn from the Central Shaba Project Area", Robert R. Nathan Associates Inc., USAID/Kinshasa, 1986. Provides baseline data on corn prices and trade in Shaba.
- Associates in Rural Development. "Institutional Analysis of Rural Roads Maintenance Problems in Bangladesh", ARD, Washington D.C., 1988. Evaluation of institutional problems associated with the implementation of road maintenance in Bangladesh.
- Cleaver, K., A. de Largentaye, N. Iweala-Okonjo, C. Trapman. "Zaire Agricultural Sector, Recent Performance and Issues", World Bank, Kinshasa, 1987. Recommends policy and investment strategies for GOZ, World Bank, and other donors.
- Coopers, Lybrand. "Guide comptable", Projet 660-105 AG, USAID Lubumbashi, 1988. Plan and guide to project accounting system and procedures, as well as internal control system and procedures.
- Couttenier, Walter. "Rapport des Activites de Trabeza-Mbeko-Shaba dans l'Aire du Projet 105" Fungurume, campagne agricole 1988-89. First report coming out of TMS on seed multiplication and distribution in 105 project area.
- Danniell, Douglas. "Draft Scope of Work, Project 660-105 Information Office", USAID/Kinshasa, June 1988. Prioritizes information needs of SCAD.
- Delouche, James C. "Study/Review of North Cameroon Seed Multiplication II Project" Seed Technology Laboratory, Mississippi State University, USAID/Cameroon, June 1986. Recommends contracting out seed production to farmers.
- Departement de l'Agriculture, Service Etudes et Planification Agricole. "Region du Shaba, Etude Regionale pour la Planification Agricole", Project 660-070/USAID/Pragma Corp., Kinshasa 1987. General inventory of agricultural economy of the region.
- _____, Direction des Marches, Prix et Credits de Campagne, "La Vente des Produits Agricoles par l'Agriculteur Traditionnel dans les sous-Regions du Kwilu et du Kwango et les Villes de Kikwit et Bandundu", Projet AGCD-K.U. Leuven, Kinshasa, September 1988. Survey of sale of agricultural products by farmers in the Bandundu region.

- Departement des Travaux Publics. "Manuel de Formation, Travaux avec Main d'oeuvre Intensive", Gouvernement de la Republique d'Haiti, July 1980. Training manual for application of labor intensive road maintenance and construction procedures.
- Development Alternatives, Inc. "North Shaba Rural Development Project, Zaire, Final Report: Technical Assistance Contract 1977-1986", Washington D.C., April 1987. An overview of PNS achievements and problems by the TA contracting firm.
- Henn, J.K., et al. "Mission Wide Evaluation of Women in Development", USAID/Kinshasa, November 1988. Recommended that more attention be given to gender issues.
- Johnson, E. Douglas. "Successful Seed Programs: A Planning and Management Guide", Westview Press, Boulder, Colorado, 1980. General guidelines on how to plan, implement and manage seed program activities.
- Mwena, Mwadi Kilumba. "L'Etude des Groupes Pre-cooperatifs de l'Aire du Projet 105 Agricole", USAID/Lubumbashi, 1988. Profile of village-based cooperative groups in the 105 project area.
- Mwenge, M., I. Ntembwa, M. Nyunyu. "Rapport de Mission sur la Commercialisation des Produits Agricoles dans l'Aire du Projet 105 et ses Environs", USAID/Lubumbashi, September 1987. Corn production data gathered from SNCZ statistics at the railheads.
- Organization of Economic Cooperation and Development. "Economic Design of Low Traffic Roads", OECD, Paris, 1986. General Guidelines utilized for design of low traffic roads.
- Pelissier, J., B. Rambocas, J. Van der Ven. "South Shaba Development Project", Staff Appraisal Report, World Bank, 1987. Project to increase corn production in the mining area of Shaba, including input supply and seed production, extension, and agricultural credit.
- Poulin, R., G. Appleby, Q. Cap, R. Griego. "North Shaba Rural Development, Evaluation Report, Development Alternatives Inc., USAID/Kinshasa, 1986. Came to the conclusion that PNS was a success because of increase in corn production.
- Rassas, Bachir, S.T. Chew. "Suggested Research Agenda and Methodology for Monitoring and Evaluation of the Central Shaba Agricultural Development Project", USAID/Kinshasa, February 1988. Scope of work for SCAD.
- Rectenwald, D., J. Born, R. Harreslon, C. Pappas, W. Pruitt. "Shaba Institutional Inventory", USAID/Kinshasa, 1986. Inventory of Project 105 area institutions: local government, religious organizations, private enterprise, cooperatives.
- Redding, D., A. Black-Michaud, S. Reddy, S. Watts. "Evaluation, North Shaba Rural Development, 660-0059, Zaire", International Agricultural Development Services, USAID/Kinshasa, May 1982. Came to the conclusion that the project should be terminated.

- Rosenthal, Irving, L. Jackson, R. Mara, L. McPherson.
"Development Management in Africa: The case of the North Shaba Rural Development Project in Zaire", AID Evaluation Special Study No.32, USAID/Washington D.C., December 1985. Analyses the management problems of PNS by examining the general context in which the project set.
- Russel, Diane. "The Integration of Women as Farmer Leaders in the Central Shaba Project", USAID/Kinshasa, February 1988. Recommended effort in project outreach to women.
- Secretaria de Asentamientos Humanos y Obras Publicas,
"Instruccion para la Construccion de los Caminos Rurales", Mexico.
General guidelines utilized in Mexico for construction and maintenance of rural roads.
- Service de Vulgarisation Agricole. "Documents Preares pour la Session de Formation des Agents de Vulgarisation du Projet Shaba Central", Checchi and Company Consulting, Inc., Niembo, 1988. Training manual for project 105 extension agents.
- Sines, Richard, C. Pardy, M. Reintsma, E.S. Thomas. "Impact of Zaire's Economic Liberalization Program on the Agricultural Sector: A Preliminary Assessment". USAID/Africa Bureau, Office of Development Planning, Washington D.C., September 1987.
- Transport Research Board. "Construction por Etapas", USAID, 1979. Guidelines for stage construction of rural roads in developing countries.
- USAID. "The Central Shaba Agricultural Development", 660-0105 Project Paper, USAID/Kinshasa, June 1986.
- _____. "Secondary Road Development", 521-0149 Project Paper, USAID/Haiti.
- _____. "Highway Maintenance", Project Paper, USAID/Costa Rica, 1969.
- Verhulst, Guido. " Etude Socio-Economique de Kabongo et ses Environs", USAID/Lubumbashi, April 1987. Survey of Commercial Activity in 11 villages in the 105 project zone.
- _____. Untitled document, USAID/Lubumbashi, 1987. Demographic Study of 40 villages in the Kabondo Dianda villages, includes methodology to gather and analyse population data in the project zone.
- World Bank. "The Economic Analysis of Rural Roads Projects", Staff Working Paper No. 241, Washington D.C., August 1976. General World Bank guidelines for an operational approach to the economic analysis of rural roads.

ANNEX 1

PROJECT MANAGEMENT

1. Overall Project Management

1.01. The responsibility for overall project management, including the coordination and integration of the three project components is assigned to the Project Coordinating Committee (Comité de Coordination du Projet, CCP). The chairman or coordinator of the CCP is a senior official of the Department of Agriculture (DOA). Other Committee members include senior representatives of the Department of Plan's national and Shaba regional offices (1 member each), the Office des Routes' national and regional offices (1 member each), the regional DOA office (1 member), and USAID/Kinshasa's Agriculture (ARD) and Project Development (PDO) offices (1 member each).

1.02. The PP specified that the Coordinating Committee would meet at least twice a year during project implementation. However during the first two years of project activities (late 1986-late 1988) the Committee held only one formal meeting (November 1988), due largely to debate during 1986-87 concerning the chairmanship of the Committee (specifically, whether the Chairman should be selected from DOA or DOP). This debate was resolved in 1987 and formalized in Project Implementation Letter (PIL) No. 13 (August 1988), and the first Committee meeting was held soon thereafter. The second meeting is presently scheduled for February 1989, implying that the Committee may meet more frequently than scheduled, if there are problems or issues which merit more intense attention.

1.03. The CCP is the only formal mechanism for the integration and coordination of the three separate project components. However there is considerable contact and informal coordination between the managers and implementation personnel in Kinshasa, Lubumbashi (the site of the headquarters of the project field offices and the GOZ regional offices), and the project area.

1.04. The structuring of the CCP was intended to assure high-level GOZ and USAID management, monitoring, coordination, guidance, and approval of the three project components. While this structure also provides representation in the CCP by the senior managers of the project agriculture and roads components, there is no formal representation by the managers of the third project component, the private sector seed operations.

1.05. At the November 1988 meeting the Committee reviewed and recommended actions concerning several administrative and monitoring activities of project management. In addition, the Committee also recommended immediate action or consideration of action concerning several extremely problematic aspects of the

project, including the operating costs of OR, the need for grain storage facilities, the road rehabilitation priorities for the 1989 agricultural season, the need for ferries at several key points in the road system, and the importance of sustaining the results of the North Shaba Project through the maintenance of the roads in the PNS area, the construction of additional grain storage facilities, and the continued provision of improved seed throughout the PNS area.

2. The Management of the Project Components

2.01. The activities of the three project components are managed by three discrete organizations which operate with a relatively high degree of independence from each other. The agricultural component is managed directly by the project, while the seed activities are managed by a private Zairian company and the roads component is implemented by the GOZ Roads Bureau, with project-financed technical and administrative support.

2.02. The management structure and operations of the agricultural component are described below. Brief descriptions are also provided of the relationship between project management systems and the organization implementing the seed and roads activities; details on the internal management of the seed company and the Roads Bureau are presented in Annexes 4 and 5.

3. The Management of the Agricultural Component

3.01. Project Activities Coordination Unit - The agricultural component is managed by a two-person unit, the office for the Coordination of Project Activities (Coordination des Activités du Projet, CAP). In addition to its primary responsibility of management of the agricultural component, CAP also functions as an operational Chief of Party for the overall project and handles project relations with the various GOZ national and regional offices, as well as US and other donor offices. In its role as operational Chief of Party, CAP performs an advisory, coordinating, and monitoring role with relation to the private sector seed company responsible for the seed component. CAP also maintains daily relations with the Field Project Officer for the roads components (whose office is in the same complex in Lubumbashi) and has frequent contact with contractors implementing the roads activities, both in Lubumbashi and in the project area. Through these contacts CAP serves as an informal operational coordinator between the roads component and the other project activities, and also provides advisory support to the advisers of the road component.

3.02. The relationship of CAP, and the CCP as well, to the three project components is outlined in the project organizational chart presented in Exhibit 1.

3.03. CAP members include the DOA's Coordinator of the Project Coordinating Committee and USAID's Field Project Officer for the agriculture component, a personal services contractor (PSC). It was envisaged that the DOA representative would allocate 3.5 days per month to 105 project responsibilities; however, he actually devotes about three to four times that amount of time to the project. The USAID member of CAP, who also serves as the Area Development Offices for USAID's regional office for the Shaba region (the Shaba Area Development Office, SHADO), originally was to allocate 60% of his time to his 105 responsibilities, presently he is devoting about 75% of this time to SHADO and only 25% to 105.

3.04. CAP appears to be an extremely effective mechanism for maintaining high-level GOZ and USAID representation in and support for the operational coordination and management of the overall project. The unit's effectiveness is to a large extent attributable to the impressive capability, energy and dedication of the present team members, as well as to their extremely harmonious working relationship.

3.05. As the unit charged with the management of the agriculture component, CAP provides operational and financial guidance to the three offices within this component, the Office of Logistics, Administration and Audit (Service de Logistique, Administration et Audit, SLAA), the extension service, and the information office. The guidance which CAP provides is indeed extensive -- CAP must approve all personnel decisions, virtually all financial expenditures (with the concurrence of SLAA), and all major operational decisions, including those pertaining to equipment and vehicle use. The motives for the establishment of such a tightly-controlled and centralized system are several: (1) to relieve the project area officers of administrative and public relations responsibilities, so that they may concentrate on their technical work; (2) to avoid the /mistakes/ of the PNS project, in which shared and relatively decentralized authority over personnel and finances resulted in a highly bloated bureaucracy and considerable misallocation of funds; (3) to relieve project area officers from the relatively frequent requests and pressures for use of project equipment, vehicles, and funds.

3.06. Although in some circumstances such centralization of management authority might be considered cumbersome and excessive, the system appears to function smoothly (partly due to a fairly reliable and quick communications system between the project area offices and the Lubumbashi field office). The system also appears to be appropriate at the present time, as the project attempts to establish new standards for project resource use and to complete its start-up activities as rapidly as possible (including the hiring of most long-term personnel and the purchase of most equipment and vehicles). However as the project matures, it would be useful to consider increasing the delegation of management

authority to project area officers in order to assure that the new management standards are accepted and practiced by all project management personnel and to contribute to the sustainability of the new management standards after the departure/reassignment of the present management team.

3.07. There is a strict personnel ceiling for the operations of the agriculture component -- the personnel limit has been set at 65 long-term project employees not including the 4 expatriate contractors. (This contrasts sharply with the personnel record of the PNS project, which at one stage had over 800 employees for an area which is one-third the size of the 105 area). A considerable effort has been made to design innovative methodologies to accomplish project objectives with minimal, yet effective, personnel. However with USAID agreement, the personnel ceiling has been circumvented through the local contracting of several dozen additional employees. Largely unskilled workers (such as guards, drivers, and field laborers), these personnel are hired through short-term contracts; however many of the contracts are in fact expended repeatedly. Although this contracting system is less costly than other hiring mechanisms, it may cause resentment and inequities among employees, thereby negatively affecting project efficiency. If this is presently the case, USAID should consider a moderate increase in the personnel ceiling to provide for any additional unskilled and semi-skilled positions which are essential to project performance.

3.08 Service de Logistique, Administration et Audit. SLAA is responsible for the agriculture component's financial and personnel management, as well as procurement, logistics, and inventory control. The unit includes fourteen professionals and support staff, as well as an expatriate manager. The financial management, accounting, and inventory control systems utilized by the unit were designed by the international accounting/consulting firm, Coopers and Lybrand, which also conducted a training seminar in the use of the systems for SLAA and SVA personnel. The systems appear to have been meticulously designed, although the limited time spent by the evaluation team in the field did not permit an analysis of the extent to which the systems are actually followed. However there were numerous indications that the financial and inventory management functions are extremely tightly controlled. For example, virtually all expenditures by SVA (even those totalling less than \$1.00) are reported in writing to SLAA; these expense reports require the approval of the Director of the extension service, as well as the expatriate advisor. Further, there are small operating funds (\$1,000 - \$2,000) in each of the three extension zones; these funds are under the discretion of the Extension Director and the expatriate advisors in each zone. Nevertheless, prior approval is reportedly sought from SLAA and the Field Project Officer (FPO) for any expenditures exceeding \$50.

3.09. Despite this high degree of centralization of financial authority and management control, the field managers of the extension activities feel pleased with the degree of authority and independence which they hold. They see the system as supportive rather than restrictive and note that it effectively protects them from unreasonable requests for use of project resources. They contrast the present 105 system with that of PNS, where unclear lines of authority coupled with multiple layers of bureaucracy resulted in a cumbersome, inefficient system which effectively reduced their authority to a much greater extent.

3.10. It was unclear to field project managers exactly when or how often their operations are to be audited. Only one audit has in fact been conducted since the start of the project; the audit was performed last year in response to an irregularity, which was immediately corrected. Project managers expressed an interest in having the financial and inventory operations audited on an annual basis. This would be advisable certainly in the early project years, as the staff learns to use the new management systems; the first of these audits should be performed in the very near future.

3.11. Computers have only recently been introduced into the SLAA operations; the staff is not yet able to fully utilize the equipment and the software packages. Some computer software training is planned for 1989; however this training should be given top priority and scheduled in the immediate future. Not only short term training be provided, but a consultant should be made available on a part-time basis for several months to provide guidance as needed in the use of the equipment and software. It may be possible to identify a local-hire consultant from the Lubumbashi area to provide the on-going advisory services.

3.12. The SLAA operations should be fully computerized. Each member of the professional staff should have ready access to a computer, and the secretarial staff also should have reasonable computer access. This will require at least one additional computer, possibly several more. SLAA's computer needs should be carefully reviewed and provisions made for any additional requirements.

3.13. SLAA's procurement and logistics operations have been constrained by a shortage of vehicles and considerable delays in the procurement of vehicles and equipment. An emergency order of vehicles required over a year to be filled, and vehicles which have been delivered to Zaire have remained in Kinshasa for several months before the necessary customs procedures are completed. It is not clear exactly where or why these delays are occurring; they are apparently occurring at various points in the USAID and GOZ bureaucracies. The entire procurement process, from ordering procedures through to final delivery to the project area, should be reviewed; any actions necessary to streamline and accelerate the procurement process should be undertaken, including possibly the

assignment of additional personnel to the SLAA/Kinshasa or USAID procurement offices or the restructuring of authority for procurement procedures.

3.14. Service de Vulgarisation Agricole. The extension service is headed by a Zairian Director appointed by the GOZ Department of Agriculture. He manages a staff of 25 extension agents, 7 technical/administrative/support personnel, and 3 expatriate extension advisors. Further details on the organization of the extension service are provided in Annex 2.

3.15. The extension agents, who much of the time work alone in isolated rural areas, function with a considerable degree of autonomy. Project managers appear to have been highly successful in the selection of personnel who can be trusted with this independence and in the establishment of control systems through which the agents' performance can be monitored and supervised. The extension personnel appear to be extremely motivated, committed, and dependable. They are clearly enthusiastic about working for the project, although salaries are extremely modest (total compensation for the typical agent is \$67/month). Nevertheless, project salary levels are considerably higher than those for equivalent public sector positions.

3.16. The performance and activities of the extension agents are monitored through such mechanisms as monthly reports from each agent, the semi-annual training sessions, visits and spot checks by supervisory personnel, and careful rationing of motorcycle fuel according to the distances to be travelled. In contrast to the PNS project, 105 managers have the authority to fire agents and other project personnel for non-performance.

3.17. The overall performance of the extension service is particularly notable because of its flexibility and adaptability in dealing with unforeseen circumstances. The personnel have compensated for weaknesses in other institutions and unexpected events in a highly energetic and creative fashion by effectively performing several additional tasks which were not initially planned.

3.18. It appears that the extension service may need a modest dollar budget for the purchase of certain essential equipment which is reportedly not available locally (including certain audio-visual, meteorological, and solar energy equipment). This issue should be reviewed and if there is a clear need for overseas purchases, the project should be amended to provide a limited dollar budget for the agricultural activities.

3.19. The overall budget for the extension service and the other agricultural activities should also be reviewed. It is possible that additional funding will be needed because of necessary changes in project design, the acceleration of the

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implementation schedule, and additional needs which have arisen since the time of project design.

4. The Management of the Seed Component

4.01. The corn seed production and distribution activities are performed by a private Zairian company. USAID has no direct management control over the company's activities. There are, however, several indirect mechanisms through which USAID can influence the company's activities; these include:

(1) enforcement of the contract stipulations, which specify the goals to be achieved (sale of open-pollinated corn seed to the project area at an unsubsidised price) but not the methods through which to these goals are to be accomplished;

(2) the start-up/risk payment scheme, which for five years provides payments according to the volume of seed marketed to the project area;

(3) guidance and advice on the technical assistance activities and the reports which the company is required to submit (quarterly and semi-annual reports on technical, financial, and marketing plans and achievements).

4.02. Project financing of the seed activity include not only the start-up/risk payment plan, but the funding of approximately four person-years of technical assistance and an annual reimbursable advance of \$25,000.

4.03. Under the start-up/risk payment scheme steadily decreasing amounts are paid to the company according to volume of seeds marketed annually during the five-year start-up period. The amount which can be earned each year also varies--the maximum amount is planned for the annual target tonnage defined by the project, with declining levels of payment/ton beyond the target level. For example, in the second year of the scheme, the company earns \$2,000/ton if the target level of 30 tons are marketed, but payments are only \$1,417/ton if 60 tons are sold. Table 1 outlines the payment schedule for total tonnage sold each year, while table 2 provides the payment schedule according to payments/ton over the five-year period.

4.04. The start-up/risk payment schedule needs to be reviewed in order to assure that it provides an effective incentive to desired performance and that it fairly compensates the company for start-up expenses and the considerable risk incurred. Payments are much higher in the first two years than in the final three years, presumably to compensate for major start-up investments. However it is optimistic to assume that all such investments can be made this quickly; more time clearly likely needed to plan, test, and reformulate the company's strategy and to define its investment

requirements. Thus it would appear appropriate to increase the possible payments in years 3-5.

4.05. The payment plan structure of levelling off total payments beyond a volume which is close to the target tonnage (thus decreasing the payment/ton) clearly can act as a disincentive to the higher volumes of sales. Instead, payments should increase steadily up to a reasonable cut-off point. There should also be higher payments for the lower volume of sales in the later project years (years 3-5).

4.06. Because of the eleven-month delay in the signing of the contract with the seed company and the technical assistance subcontractor, the company was unable to properly plan and execute its first year's activities (the first production season was essentially missed and the company was forced to purchase seed for the project area). It would be appropriate to extend the payment schedule for an additional year to compensate for this delay; for 1989 the year 1 schedule should be repeated or a combination of the year 1-2 payments provided, with the remaining year 2-5 payments extending through 1993 (PACD).

4.07. The adequacy of the annual loan fund (\$25,000, to be reimbursed after the sales season) should also be reviewed. In the earlier project years it may be necessary to increase the loan size in order to assure that funds are available for necessary vehicle and equipment purchases.

4.08. The internal management of the seed company is described in Annex 4.

5. The Management of the Roads Component

5.01. The road rehabilitation and maintenance activities are managed directly by the GOZ Roads Bureau, although the project provides strong technical and management guidance and support through the expatriate advisors stationed in Kinshasa, Lubumbashi, and at several points in the project area

5.02. Additional staff is presently needed to assist in the Lubumbashi SGMPT procurement, logistics, and inventory control activities. The scope of Services for the Training Advisor position should also be modified in order to provide specialized support in labor-intensive techniques.

5.03. If in the future operational funding is provided by the project to OR, it is strongly recommended that personnel payments be formulated according to a performance-based system, where earnings are based on actual output achieved. These earnings could be considered a supplement to the workers base salary, which would remain the responsibility of OR.

ANNEX 2

THE AGRICULTURAL EXTENSION SYSTEM

2.0. Introduction

2.01. Project Goals: Monocropping or Multicropping

According to the Project Paper (PP), the main goal and purpose of the Central Shaba Project (105) is to promote self-sufficiency in staple food crops, particularly corn, and increase production to enable the small cultivators of central Shaba to market greater quantities of corn for export to other regions, and thereby increase their incomes. However, this monocropping strategy was never fully implemented in the field. Instead, to comply with the self-sufficiency goal assigned to the project, the need to diversify the crops covered by the agricultural program arose for the following reasons:

- Corn is difficult to grind, and its processing requires soaking and repeated hand-pounding. Therefore, over most of the Central Shaba area, except in the larger villages and towns which are equipped with diesel powered mills, it is rarely consumed by farmers as women's work load is already over-filled with agricultural, household and food processing tasks.

- On the other hand, manioc is the staple food over most of the project area, and had to be an important part of the extension package if the project was to focus on the promotion of self sufficiency in staple food crops.

2.02. Other factors influenced the present trend towards crop diversification. Although this has not been thoroughly investigated, project agronomists feel that shifting corn cultivation could be an important cause of deforestation, and that crop rotation should be encouraged to stabilize the soil. From the same source, shifting cultivation was also viewed as a cause of social problems related to instability and difficulty of access to services such as health and education. On the level on nutritional intake, multicropping was also mentioned as a strategy to balance the food intake of farmers and particularly that of children. Lastly, the agricultural extension component (SVA) of the project has had to respond to an overwhelming demand of farmers for improvement of other crops.

2.03. Adaptive Research

Another area in which the implementation of the agricultural program has significantly departed from what was planned in the project paper is that of adaptive research. According to the PP, the extension system was to be closely linked to the National Food

crop Research System (RAV). This research system was to provide technical assistance to field personnel and take the lead in adapting the results of research to the project area as a whole, and to its sub regions. Unfortunately, RAV has not been able to provide these services to Project 105, and SVA had to fill the void by conducting its own adaptive research in order to sustain its extension effort.

2.04. To achieve this goal, SVA has set up a series of trials at the Niembo station. Furthermore, on-farm trials are being carried out on contact and other farmer's fields throughout the project area. These trial and validation fields are set up and cultivated by the farmers under the guidance, and with the participation of the extension agents. The farmers provide labor and keep the harvest.

2.05. Seed Multiplication

To avoid delays in responding to farmer demand in the area of improved seeds for crops other than corn, SVA has set up a number of seed multiplication fields for peanut, soya bean, rice and manioc cuttings in Niembo and on farmer's own fields. For the same reason, the SVA's extensionists have also taken up the distribution of seeds, and participated in the distribution of corn seeds while the seed farm of TRABEZA is not yet fully operational in the area of seed distribution.

2.1. Description of the Extension System

2.11. Crops

At present, although the main emphasis of the extension effort still lies on corn, other crops such as manioc, peanut, soya beans and rice are included in the program. Soya bean is not cultivated traditionally in this area. However, its high protein content, and positive effect on soil fertility has made it attractive. Several missions are trying to promote it for improved nutrition programs targeted to babies and young children. SVA is contributing to this effort through a PCV and an extension agent, both working with women to promote the processing of soya into milk and flour. The SVA is also planing to look into other types of bean. Demand for improved peanut seed is high since, according to farmers, this crop sells at high prices, and is easy to transport because of its light weight. The demand for improvement of rice cultivation stems mostly from the region of Kabalo where it is grown traditionally. This crop also has high development potential in other parts of the project zone.

2.12. The Technical Package

In this initial stage of innovation, the technical package has purposely been designed and kept simple. It includes the following elements:

- Improved seeds (improved cuttings for manioc)
- Timely sowing
- Row planting
- Increased density of planting
- Weeding
- Timing of harvest

New methods of intercropping manioc and peanut, as well as rice relay under corn have also been introduced on a number of demonstration fields. Through adaptive research, this basic technical package is applied to the different ecological zones of the project. Such is the case particularly for the south of the project zone (Malemba/Kikondja) where the poorer sandy soils, irregular rainfall, and a tradition of corn and manioc intercropping may warrant a location specific approach.

2.13. Structure, Staffing and Personnel management

The extension service (SVA) has its headquarters at the Niembo Station. It is headed by a Zairian Director with an expatriate advisor. The Niembo station is divided in several offices dealing with adaptive research, storage, training, women in development, and agricultural extension. This last office branches out into the three extension zones in which the project zone has been geographically sub-divided: Kabalo, Kabongo, and Malemba/Kikondja.

2.14. Each of the three zones is headed by a zone Chief with an expatriate advisor except for Kabongo Zone where geographical proximity allow the SVA Director and his advisor to assist the zone chief. Each zone is broken down further into Extension Centers. In total, there are 14 Centers located in the larger villages. Each Extension Center is headed by a Center Chief who guides and supervises a number of extension agents based in villages. In the Centers which cover a large area, the Center Chief is backed by an assistant (See figure 1).

2.15. In compliance with the project paper guidelines, the SVA is independent from the Zairian Department of Agriculture Extension system as far as personnel and financial management is concerned. Hence, the extension agents receive their salaries from the Project. These monthly payments can be broken down into the equivalent of civil service salary (four of the extension agents are actually civil servants but are not receiving their government salaries) to which a USAID approved project supplement which varies according to performance is added. When hired, extension agents go through a 6 months probationary period after which their capacity to stay on is judged according to the results of their

work. This has provided SVA a tight control over its personnel, allowing it to reward performance and part with incompetent agents. One third of the agents have two year contracts to permit a flexible phasing out of extension in the future . The CAP in Lubumbashi takes care of most of the administrative and public relation duties of SVA, so that the technical staff can concentrate on extension.

2.16. One of the goals that SVA has set itself is to limit the number of extension agents. At present, there are 25 extension agents working in the field including 2 women, and the SVA has set the target of 40 agents, including five women, as the maximum number for the first 7 year phase of the project. Two PCVs, a male and a female, are now working as extensionists in the project zone. Another eight PCVs are now in Peace Corps training and will join SVA in early January of 89. Later that same month, 5 or 6 new PCVS will be assigned to the Project. The total number of PCVs programed for 105 in the first phase of the project is 16, SVA hopes that half of these volunteers will be women.

2.17. Extension Methodology

The extension methodology developed by SVA is an innovative form of the Training and Visit System. The Project Paper advocates the reliance on a cadre of locally-supported contact farmers, men and women, chosen from village communities to serve as link between extension agents and other farmers in the dissemination of information relating to improved seeds and cultural practices. Based on this approach, SVA has set up a methodology based on systematic and scheduled contacts between three levels of extension, each targeted to a limited and specific group.

2.18. On the first level, each extension agent is based in a village selected according to size, accessibility and interest of villagers in working with the project . He is equipped with a bicycle or a motor-cycle. From his base, he covers a dozen surrounding villages at present, and a higher number as he acquires experience. The extension agent, with guidance from the Center Chief, then selects an average of 30 to 35 contact farmers. This number will also be raised to as much as 75 as time goes on. The extension agent is then responsible for on-farm training and supervision of these contact farmers whom he visits regularly, about once every two weeks during the major agricultural operations.

2.19. The second level of extension carries the technical message from the contact farmer to other farmers. Although contact farmers are supposed to demonstrate new techniques and inform as many villagers as they can about the program, each one concentrates his/her efforts on a group of people that he/she selects himself among his/her neighbors, relatives or farmers whose fields are close by. The number of farmers per contact farmers averages

between 6 and 8 at present, but SVA hopes to increase it to over 10 in the future. For the contact farmer, working with this group involves organizing demonstrations on his fields during the main cultivation operations, encouraging farmers to visit demonstration fields, and initiating observation and discussion of the results, as well as assisting farmers who decide to adopt the new practices.

2.110. The third level of extension involves the link between the extension agent and the general farming population of the area he covers. To reach this population, each extension agent holds village information meetings. However, each extension agent concentrates his efforts on the organization of Agricultural Field Days which he holds in different farming communities, approximately once during each major cultivation operation. SVA finds that, at present, to be manageable, the number of participants for field days should be limited to about 10 farmers. However, this number will be increased as the experience of the extension agent grows. A field day lasts for 2 to 3 hours and focuses on explanations about the project technical package by the extensionist, as well as open discussions about changing cultural practices.

2.111. The brunt of the extension effort lies on the utilization of Demonstration Fields as outreach and teaching tools. These are small fields averaging 0,25 Hectares located on contact farmer's fields. The produce is kept by contact farmers at harvest. Their design is very simple, one half of the field is planted in one crop with local variety and traditional cultivation practices, and the other half is planted with improved variety and recommended practices. With a similar lay out, manioc and peanut intercropping has also been included on demonstration fields.

2.112. Teaching aids and equipment are minimal. Extensionists use visual aids such as flip charts, posters, and flannel boards. The contact farmers receive simple, one or two sheet pamphlets on agricultural practices printed in local languages (See examples in Figures 2 and 3)

2.2. Selection, Training and Supervision of Extension workers

2.21. Extension Agents and PCVs

Most of the extension agents hired by the project have had some degree of technical training in agricultural high schools which offer a six year program. To select candidates, SVA uses questionnaires, interviews, and written exams. In the past, there have been many candidates for these positions and SVA has chosen approximately one in ten.

2.23. Once the extensionists are selected, they participate in a two week training session at Niembo. The training consists of in-depth technical instruction on the recommended package, setting up and monitoring trial, observation and demonstration fields, as

well as learning communication and adult education skills. When they have finished this initial training, the extensionists spend a period of two months of on-job training before they are assigned to a post. Twice a year, in June and December, all extension agents come back to Niembo for a period of one week to ten days for further training. At this time, they set their own targets and schedule of activities for the following agricultural season, with guidance from SVA supervision personnel. Sessions of self evaluation of their performance are also held at this time. Extensionists are sometimes taken on field trips to visit other agents which gives them an opportunity to discuss their work experience. A total of 21 extensionists were trained in Niembo, the SVA Director went to Israel for training, and nine extensionists were sent to RAV for technical training. The PP advocated a periodic return (every 6 months) of all extension agents for skill upgrading at the National Legumes Research Center at Gandajika. However, this has not been done as it appeared very cumbersome in terms of logistics. Instead, this type of training has been conducted in Niembo.

2.24. For training purposes, extensionists are required to set up observation fields on farmer's fields near the village in which they are based. These allow the agents and SVA to make their own observations about the technical package when applied to a particular area of the project zone.

2.25. Supervision of extensionists is done in several ways. Each extension agent writes reports which are sent up the pyramid and centralized in Niembo. Zone chiefs and SVA supervision personnel know the program of activities of the extensionists, and run spot checks on them. Once in a while, the supervision personnel ask farmer's opinions about an extensionist's performance, but they usually get spontaneous feedback from villagers.

2.26. The two PCVs working as SVA extensionists at present have followed the regular Niembo, and on-job training program, after their Peace Corps training. They have been assigned to work as a team with a Zairian counterpart for a period that will probably vary on a case by case basis. As their local language capacities and technical know how improves, they will be assigned to cover an area on their own.

2.27. Contact Farmers

The contact farmer concept constitutes the base of the SVA's extension system. Its purpose is to encourage local initiative and promote improved cultivation practices, without having to rely on a large cadre of extension agents, thereby ensuring the sustainability of the extension effort. Contact farmers are identified by extension agents, but many of them are also self chosen, or chosen by their communities. According to the PP,

contact farmers should be chosen on the basis of the following criteria: the individual should be respected in the community, married, literate, and able to travel and receive instruction. The literacy criterion was later abandoned as it barred some dynamic farmers from selection, particularly women. The literacy rate in Zaire is around 55%, and at present, about 75% of contact farmers are literate. SVA also added the criterion of willingness to set up a demonstration field.

2.28. At the onset of the program, by seeking influential people, there tended to be an over-representation of the wealthiest members of communities in the group of contact farmers. However, this left out some dynamic farmers, and an effort is now made to include representatives of all socio-economic groups.

2.29. Contact farmers are volunteer agricultural extensionists, and this is explained to candidates. However, some contact farmers expected to get a form of payment from the project, and lost interest when this did not occur. For this reason, about 10% of contact farmers have dropped out of the program.

2.3. Outreach

2.31. Missions and Schools

Outreach to farmers is not an easy task in the 105 project zone where communications are difficult, and deteriorated roads isolate many villages from access to information. The PP advocated reliance on private and voluntary organizations such as religious missions or village-based organizations (eg. cooperatives) to develop the extension network. To comply with these guidelines, an Institutional Inventory of Shaba has been made (Rectenwald et al. 1986).

2.32. The SVA has started to work with a few missions. In Budi (Kabongo Zone), the extension agent collaborates with a mission sponsored animal traction program. The wife of the Zairian veterinarian in charge of the program is a project contact farmer, and has set up her demonstration field near the mission, attracting other women who pass by. Another contact farmer from Budi is a trainee in the same animal traction program. In Kabondo-Dianda (Malemba/Kikondja Zone), the trial and demonstration fields are located on the mission farm. Many parishers who work on this farm while receiving religious instruction have been impressed by the demonstrations, and are adopting the new techniques back on their own fields. The extension agent also works with a group of parish women. SVA has started to collaborate with schools. Near Niembo, a schoolmaster has set up a demonstration field next to the school building, and gives agricultural instruction to the pupils.

2.33. In general, SVA has tried to pay close attention to the strategic location of demonstration fields. This is difficult in

Shaba as fields, especially those located in the forest, are often quite isolated from villages, and from other fields. However, whenever possible, fields have been placed in highly visible areas. Such is the case in Kitobue (Malemba/Kikondja Zone), where the demonstration fields are located at the fork of well traveled roads, or in Kabalo where a corn demonstration field has been placed along the Zaire river, close to a bridge leading into town.

2.34. Cooperatives

At present, SVA is planning to start working with cooperatives (officially these groups are called pre-cooperatives as they have not gone through the legal steps required by the GOZ to reach the cooperative status). Recently, a 105 project zone study (Kilumba 1988) identified and analyzed 40 cooperative groups, the highest density being found in the Kabongo area. The degree of cohesiveness of these groups seems highly variable, and many do not seem to go much beyond existence on paper. Another factor will warrant care from SVA in its choice of cooperatives: a study on women in the project zone (Russell 1988) points out that cooperatives are often organized by elites who benefit from the unpaid labor of members.

2.35. PVOs

Other than the Peace Corps, there are practically no PVOs working in the region at present with which SVA can collaborate in its outreach effort. The remoteness of the project zone is the main cause of this void. The Peace Corps agreed to place its agents in Central Shaba only on the condition that Project 105 could give guarantees with regards to medical evacuation of volunteers. However, it is expected that other PVOs will be attracted by the development potential of the region, once the road network improves.

2.4. Results

2.41. Quantitative Results and Targets

There are now 250 villages included in the the extension network, and SVA plans to double that number by year 7 of the project. The SVA estimates that, out of the 63,000 project zone farming families, 8,500 families have already had contacts with extensionists, and half the total households, about 30,000 will be in direct contact with the project by the end of the first seven year phase.

2.42. A total of 869 contact farmers have been identified and are being trained including 142 women contact farmers. Extensionist have organized 399 field days which were attended by a total of 2,236 farmers. A total of 259 demonstration fields have been set up, as well as 28 on-farm trial fields. A total area of

5,7 hectares spread throughout the project zone is occupied by observation fields (see Table 1).

2.43. Because of the data void caused by the absence of the information office, there is no production data available concerning the area under improved cultivation for corn or other crops.

2.44. Acceptability of the Technical Package and Impact of SVA

The technical package offered by SVA seems to be well accepted by recipients. Improved seeds are most readily adopted at present and the demand for them is difficult to satisfy. The advantages of row planting and higher plant density seem also to be well understood by farmers, although they do involve more work. The benefits of weeding are also known, but its application of farmer's own fields depend on the availability of labor. However, several farmers interviewed by the evaluation team pointed out that row and higher density planting tend to reduce weed development.

2.45. At this time, it is still difficult to assess the impact of the project in terms of objective indicators. This is due in part to the lack of baseline data, but also because in many areas, the demonstration fields have been set up this year, and although farmers seem to be already impressed by the comparison of plant development with traditional methods as opposed to new cultivation practices, most of them said that they would wait to see the harvest results before applying these innovations on their own fields in the next agricultural season. In areas where farmers have begun to adopt recommended practices, SVA agents have been so busy with extension activities that no systematic data has been collected to measure these changes.

2.46. SVA extensionists seem to have developed an excellent rapport with the farming population. Some pointed out that when they started their work, there was a bit of mistrust as farmers feared that the agents would confiscate their harvest, especially that of demonstration and trial fields for which they provide labor. At present, the agent's technical know how seem well respected by villagers. The case of a group of villages near Kabalo which organized a road repair program to facilitate access to their communities by SVA vehicles is impressive.

2.47. Contact farmers seem to enjoy the prestige of getting so much attention from SVA personnel. Although the evaluation team came unannounced in many villages, the contact farmers were always readily available, and obviously proud to show their fields. At present, only a third of contact farmers have demonstration fields, and judging from other farmer's reaction when they are able to visualize proposed innovations, those are probably the most efficient tool to pass on the SVA message.

2.48. Women's Participation in Extension Activities

In February 1988, a USAID sponsored study on the integration of women as farmer leaders in the 105 project (Russell 1988) recommended the recruitment of female cadre to work in community development and as extension agents, as well as the inclusion of information on how to reach and communicate with women in the training program of all extension agents. Since then, SVA has made a laudable effort to improve the project outreach to women. More women contact farmers were trained, and two women extensionists were hired and trained with much difficulty as few Zairian women can allocate sufficient time apart from their family responsibilities to work and live in remote areas away from home. At present, these two agents are working with women under the supervision of center chiefs and they will be assigned to a post of their own when SVA judges their experience to be sufficient. An effort has also been made to encourage and teach male extension agents to work with women while avoiding social problems and jealousy of men. SVA is also looking for a Zairian woman sociologist to staff the WID office in Niembo, with the task of advising SVA on how to work with women as well as identifying women's groups with which the project could work.

2.5. Achievements in Light of the PP Implementation Schedule

A comparison of the PP implementation plan with the activities developed by SVA, shows that the agricultural extension component of 105 is actually about one year ahead of schedule. Hence, at the end of year 2 of the project, SVA has reached and, on some items exceeded, the targets set for the end of year 3 in the PP phasing schedule. For example, this is the case for the number of villages worked with, which was set for 210 in the PP for year 3 and has reached 250 at present. The number of contact farmers set at 420 in the PP for year three of the project has actually been doubled (869) by SVA. On average, an SVA extensionist works with 34 contact farmers located in 10 to 12 surrounding villages. The PP estimated that 2 contact farmers would be chosen in each of the villages. At the moment, 3 to 4 contact farmers per village are selected for training by SVA. The population touched by the project (on the basis of 280 inhab./village set forth in the PP) was planned to reach 58,000 people by the end of year 3, when actually (with the same base of calculation) SVA has now touched a population of about 70,000 people. Lastly, the PP proposed a gradual approach in terms of starting up SVA activities in the sub-regions of the project zone by year six of project, with order of priority: 1. Kabongo-Kamungu (Kabongo Zone); 2. Budi (Kabongo); 3. Malemba-Nkulu; 4. Bukama; 5. Kabalo. However, in order to respond to farmer's demand and for outreach purposes, the SVA concentrated its efforts on Kabalo and Kabongo zones for logistical reasons in 1987, but this year it has extended its network to the rest of the project zone.

2.6. Reasons for Present Level of Achievement

2.61. Lessons Learned from PNS

One factor which explains the present level of achievement of 105 is that SVA was actually able to build its approach on the experience of PNS, which is a rare occurrence in development projects too often characterized by a short institutional memory.

2.62. The PNS extension approach was based on a standard Training and Visit system which was quite effective in terms of production results. However, it relied on a large staff which reached a maximum of 80 extensionists to cover an area of about one third the size of 105's project zone. This approach was very costly, such a large staff was difficult to manage, and the system appears to have broken down when the project ended. Hence, the SVA opted for a strategy based on a small extension staff with a maximum of 40 agents (the PP called for a maximum of 62 extensionists), and a large group of contactfarmers to disseminate innovations. To ensure proper guidance and supervision of the extension staff, the PP was amended to include two more expatriate technical advisors at the zone level.

2.63. From PNS experience, SVA has also learned to address the needs of women in the mainstream of the extension program. This integration has involved the diversification of crops to include staple food crops which are the responsibility of women, the selection and training of women contact farmers, as well as hiring and training female extension agents and teaching male extensionists how to work with women.

2.64. Continuity and Performance of Staff

Among the present SVA staff, 9 Zairian extension agents and two expatriate technical advisors transferred directly from PNS to 105. Thus, SVA was able to avoid the usual delays of project start up and plunge quickly into implementation with a core of experienced staff. However, the over riding factor which lies at the base of the impressive achievements of SVA is the dedication, enthusiasm and competence of both expatriate and Zairian personnel which permeate through all levels of the extension pyramid, in spite of the difficult working and living conditions of the project zone.

2.7. Problems and Constraints in light of PP Assumptions

2.71. Weakness of Support Activities

The SVA is so much ahead of its original schedule that, at present, support activities are not following the pace. Such is the case for adaptive research which the PP assumed would be the responsibility of the Applied Agricultural Research and Outreach

Project (660-0091, RAV). The seed farm of TRABEZA is not fully operational in the area of corn seed distribution. The village grain storage component has not started since its appropriateness is questioned in light of the fact that the bulk of harvested corn is picked up by traders directly from the fields, and because the grain storage problems seem to be much more intense at the railhead than at the village level. The lack of production and baseline data hinders SVA from evaluating extension results. The deteriorated state of the roads, and the present harvest evacuation difficulties due to poor railroad performance, may discourage farmers from increasing production.

2.72. To fill in the gaps, SVA extensionists have had to set up trial and validation fields, multiply seeds for crops other than corn, and participate in their distribution, as well as gather minimal data on yields and number of farmers and villages reached. The adaptive research is conducted in Niembo and also on farmer's fields throughout the project zone. Not only does this add on to the already heavy workload of extension agents, but the trials are often located close to demonstration fields. This is surely as confusing to farmers who are supposed to perceive the difference between demonstration fields and trial, validation, seed multiplication, and observation fields as it was in several instances for the evaluation team.

2.73. The Integration of Women

Most of the constraints relating to the expansion of women's participation in SVA's activities were extensively covered in a recent report on the integration of women as farmer leaders in the Central Shaba Project (Russell 1988). The need to train women extension agents has been identified, but SVA has had difficulty in recruiting appropriate candidates. The two female extension agents now working for the project are single, but once they get married and have a household to attend to, it may be very difficult for them to devote enough time to extension activities, and particularly to travel to other villages.

2.74. One of the main constraints to women's participation as contact farmers has to do with the heavy daily workload of Zairian rural women. Women farm, process and cook food, take care of children, and other household related tasks. This leaves them little time to devote to receiving instruction from extensionists, and to relay the improved farming techniques message to other women. Furthermore, husband's jealousy and communication difficulties (Swahili which is used as a vehicular language in Central Shaba is not understood by many women who speak only Kiluba), make it harder for male extension agents to deal with women, although some have done very well.

2.75. An issue was raised recently in a WID evaluation (Henn 1988) relating to whether women were actually losing out from the

project extension effort by having to spend more time on cultivation operations in the corn fields whose income as cash crop is managed by men, thereby spending less time on their own staple crop and income generating fields. Documenting this issue would probably involve intensive investigation of labor time allocation. However, through the diversification of crops, the training of female contact farmers and extension agents, SVA has already taken appropriate steps in addressing the issue of equity of distribution of project benefits between men and women. Women have also asked SVA to assist them in vegetable crop cultivation such as onions or tomatoes, although this last crop would be difficult to evacuate as it is so perishable. An important constraint relating to women's response to SVA's emphasis on corn production is that, in spite of the expressed wish of women to complement their family's diet with corn, it is rarely consumed in villages as milling facilities are lacking.

2.8. Sustainability of the Extension Effort

According to the PP, the sustainability of the extension effort will rest on the capacity of SVA to assist local PVOs in developing capacities to deliver extension services to their constituents. It further assumes that local institutions such as missions will be able to assure financial and managerial responsibility for SVA extensionists by the completion of the project. At present only two missions, the catholic mission in Budi and the Adventist mission near Kabongo, have sizeable agricultural programs run by specialists. Most of the other missions in the project zone have very limited agricultural activities, although some express interest in collaborating with Project 105. Furthermore, their resources do not seem to be sufficient to finance a permanent extension staff. However, Project planners feel that by the end of the second 7 year phase of the project, if adequate seed distribution services and road facilities are in place to evacuate harvests, the relative simplicity of the extension message will have gotten across to most recipients.

2.81. With present level of activity, funding for the agricultural extension program is adequate. However, if the PNS area is included in the 105 extension network, additional funding will be required to finance an expatriate technical advisor, and 10 extension agents.

2.9. Recommendations

1. The project Paper goals, and possibly the PP itself, should be amended to take into account the shift of emphasis from corn production to multicropping that characterizes the implementation of the agricultural component of the project. An attempt should be made to set production targets for crops which have been included in SVA's technical package such as

manioc, peanut, rice and beans. Furthermore, marketing potential for these crops should be examined in a similar fashion to the study on corn marketing (Ariza Nino 1987). By the same token, corn production targets may have to be revised downwards to reflect the diminished emphasis placed on this crop compared to PP goals.

2. With the present trend towards diversification of crops, farmers will be faced with more complex management choices about the mix of crops and rotation to practice on their fields, as well as the inputs to be invested in, according to potential economic return. The extension agents should be ready to assist farmers in this area. In this perspective, the extensionists should receive basic training in farm-level economic input/output analysis. Short term expertise in agricultural economics could provide some input in training of extension agents, as well as in the development of training material.
3. To alleviate the workload of project 105's extensionists, and allow them to concentrate their efforts on extension, RAV should take on a more active role in the location specific adaptive research. USAID having technical and financial input in both institutions could coordinate the establishment of a solid research/extension link between RAV and project 105, including feedback mechanisms. A full time RAV agronomist could be assigned to the Niembo station to take on responsibility for the adaptive research program. A protocol should then clearly define collaborative roles and responsibilities of RAV and SVA.
4. Once the research/extension link with RAV is established and seed multiplication mechanisms are in place, the role of the Niembo station should be examined.
5. On-farm trials in the different sub regions of the project zone are an important element of adaptive research and should be continued. However, to avoid confusion in farmer's perception, demonstration fields should not be adjacent to seed multiplication, trial, validation and observation fields. Furthermore, a labeling system differentiating these fields should be adopted and explained to farmers. These labels could be written in Swahili or Kiluba, or have different colors for each type of field.
6. At present, SVA has opted for the selection and training of a maximum number of contact farmers for outreach purposes, and has largely exceeded PP projections. However, extension agents may find it difficult to work in depth with such a high number of contact farmers. Hence, in order to consolidate the technical know how of contact farmers, SVA should slow down the pace of selection of new contact farmers. More

demonstration fields should be set up, as they seem to have a very positive impact. Meetings between contact farmers should be organized periodically to encourage exchange of views.

7. Outreach to farmers in the 105 project zone is a difficult task, as many farming communities are isolated from communication networks. Present efforts could be reinforced by the use of radio. Not all farmers own radios, however a few individuals in a village usually own, and share the use of cassette player/radio units. Unfortunately the national Zairian radio transmitters are not powerful enough to cover the whole project zone and farmers tend to listen to neighboring countries radio programs. In collaboration with the national radio which already broadcasts general interest agricultural programs, the project should consider installing a transmitter which could cover the Shaba region. This rural radio could broadcast information on project related innovations, could advise farmers on scheduling of major agricultural operations, and organize farmer and extension staff interviews and debates on agricultural topics. Marketing information could also be made available through this channel, as well as information concerning train movements for traders. It could also be used for outreach messages targeted to women such as the promotion of soya bean use. The broadcasts should also be entertaining so as to keep up people's interest. The project should also record and distribute cassette tapes on topics such as those mentioned above.
8. The outreach effort through missions, schools, and cooperatives should be stepped up. However, cooperatives should be selected carefully so as not to create, or reinforce inequities.
9. In order to improve the project's response to women's expressed needs and promote the consumption of corn as a staple crop, the development of village level milling capacity should be looked into. Because of the cost and supply limitations of diesel fuel, appropriate technology should be sought. However, care should be taken not to repeat the hand mill program failure of PNS. Short term technical assistance should be provided including expertise on appropriate technology in milling with maintenance considerations, as well as village or cooperative level credit. Local currency for this type of small scale credit operation might be available through the Private Sector Support Project. SVA could select some of the more cohesive project zone communities and cooperatives with which such a credit scheme could be initiated.

SA'

10. To face the difficulty of recruiting and keeping on the job women who have had agricultural training, but have family obligations at home, SVA should continue its policy of hiring and training some local women who have had some schooling as assistants to extension agents to work with women. For instance, the evaluation team met a female contact farmer in Budi who was literate in french, and seemed quite motivated, and willing to work with other women. Spouses of extension agents might also be considered as potential candidates.
11. USAID/Washington should devote one of its special case study publications to the agricultural component of project 105 as its achievements could constitute a source of inspiration for other agricultural extension efforts in Africa.

Table 2

Suggested Bulking Centers / Railhead Storage Centers

<u>STATION</u>	<u>CAPACITY (MT)</u>	<u>COVERED STORAGE</u>		<u>BULKING CENTER</u>
		(not covered)		
Niembo	1,000			
Nyunzu	3,000	Kabeya-Mayi	1,000	
		Lengwe		1,000
Kongolo	3,000			
Kabalo	1,000			
Nguena	500			
Kitanga	1,000	Katompe	1,500	
Kitenge	2,000			
Kamungu	2,000			
Kime	2,000			
Kabondo-Dianda	500			
TOTAL	16,000		3,500	

Source: Letter from Project 105 GOZ Coordinator to Project Coordinating Committee, October 13, 1988

TABLE I

SVA ACTIVITIES REALIZED IN 1987-88AND ACTIVITIES PLANNED FOR 1988-89

(SVA annual activities are planned according to the agricultural calendar. A year ends on August 31)

<u>ACTIVITIES</u>	<u>REALIZED</u>	<u>PROGRAMMED</u>
	<u>1987-88</u>	<u>1988-89</u>
o RECRUITMENT OF EXTENSIONISTS	20	9
o INSTALLATION OF PCVs	2	14
o SVA PERSONNEL TRAINED (PT)		
-- EXTENSIONISTS TRAINED BY RAV		11 PT
-- EXTENSIONISTS TRAINED AT NIEMBO (TWO SESSIONS)	37 PT	60 PT
o CONTACT FARMERS IDENTIFIED (CF)	869 CF	316 CF
o FIELD DAYS (FD)	399 FD	1,178 FD
o FARMERS ATTENDING FD (F)	2,236 F	12,000 FD
o DIST. PEANUT SEED FOR MULTIPLICATION	8.4 T	14.5 T
o DIST. RICE SEED " "	2.0 T	4.2 T
o DIST. SOY SEED FOR OBSERVATION	0.0 T	2.0 T
o DEMONSTRATIONS (DTS) ON FARMERS' FIELDS		
-- CORN CULTURAL PRACTICES	67 DTS	173 DTS
-- CORN VARIETIES	35 "	47 "
-- CORN OBSERVATIONS	0 "	15 "
-- MANIOC CULTURAL PRACTICES	64 "	57 "
-- MANIOC VARIETIES	0 "	12 "
-- MANIOC AND PEANUT INTERCROPPING	71 "	97 "

-- RICE CULTURAL PRACTICES	22 "	28 "
-- RICE RELAY UNDER CORN	0 "	31 "
-- PEANUT CULTURAL PRACTICES	0 "	10 "
-- SOYBEAN CULTURAL PRACTICES	0 "	24 "
-- SOYBEAN INTERCROPPING	0 "	17 "
o ON FARM TRIALS (OFT)	12 OFT	11 OFT
o ON STATION TRIALS (OST)		
-- PNMXT	1 OST	1 OST
-- ALLEY CROPPING (CORN AND LEUCENA)	0 "	1 "
-- CORN VARIETIES	1 "	1 "
-- SOYBEAN VARIETIES	2 "	1 "
-- BEAN VARIETIES	2 "	1 "
-- BEAN PLANTING DATES	0 "	1 "
-- PEANUT VARIETIES	1 "	1 "
-- RICE VARIETIES	1 "	1 "
-- MANIOC VARIETIES (CLONES)	2 "	1 "
-- RICE PLANTING DATES	0 "	1 "
-- INTERCROPPING MANIOC/SOY AND MANIOC/PEANUTS	0 "	1 "
-- EFFECT ON MANIOC TUBER YIELD OF LEAF HARVESTING	0 "	1 "
o MANIOC MULTIPLICATION (hectares)		
-- ON FARM (VILLAGE)	4 ha	35 ha
-- AT NIEMBO STATION	4.6 ha	15 ha
-- ON FARM (NIEMBO VILLAGE)	0	5 ha
o OBSERVATION FIELDS FOR CORN VARIETIES (KASAI I, SALONGO II, SHABA I, TZSR)	5,7 ha	6 ha
o SEED MULTIPLICATION AT NIEMBO STATION		
-- SOY BEAN	2,6 ha	3 ha
-- PEANUT	3 ha	2 ha
-- RICE	3 ha	2 ha
o STORAGE (SMALL SCALE)		
-- IMPROVED CRIBS		72
-- EXPERIMENTAL STORAGE MODELS		3

3.13. Choice of Indicators to Monitor

The scopes of work that have been prepared for SCAD (see references above, and especially Daniell) have identified most of the indicators which should be monitored. However, some additional comments can be made on prioritization and methodology. At this time, because of the progress of the agricultural component of the project, priority should be given to the immediate gathering of agricultural production and marketing data. To evaluate the impact of extension efforts, very basic data could be collected on the number of farmers changing cultivation practices, and on the level of change (which improved practices are adopted?). This type of information could be collected in collaboration with the extension agents.

3.14. Corn production data will be relatively easy to collect by monitoring SNCZ statistics at the railheads as was done by Cit. Mwenge for 105 in 1987. Marketing data about this crop can also be obtained by identifying and monitoring key markets. Production of staple food crops such as manioc will be more difficult to monitor and may require farm level estimates of production.

3.15. Measuring area planted with corn or other crops, or with improved practices, will be extremely difficult because of the practice of shifting cultivation which is generalized in the project zone. For corn, with available yield and total production data, it might be possible to arrive at an estimate of the surface planted. Daniell suggests investigating the costs and benefits of aerial photography and remote sensing.

3.16. Direct measures of income could only be arrived at through household budget studies which would involve conducting a broad comprehensive study. This would require important resources and would involve a major departure from the strategy which has been defined for SCAD. However, trends could be identified through the monitoring of indicators such as commercial activity as was done in the Appleby study, or standard of living indicators through the collection of data on health, nutrition and consumption.

3.17. SCAD should also investigate production systems in the sub-regions of the project zone. For example, it could assist SVA in defining its programmatic approach to the southern part of the project zone (Malemba/Kikondja) where traditional patterns of corn and manioc intercropping may warrant a different approach as that adopted in the rest of the project zone. Intrahousehold labor time allocation data could contribute to the clarification of gender issues.

3.20. Recommendations

1. The difficulties encountered by the present evaluation in assessing the initial impact of project activities is an indication of the urgency with which SCAD should become operational. If there are further delays in the staffing of SCAD, data collection should be performed under a short-term contract.

2. Based on progress of the agricultural extension component of the project, priority should be given to the immediate gathering of agricultural production and marketing data. This should include basic project impact data such as the number of farmers changing practices, as well as price monitoring for the crops covered in the extension package in the main markets of the project zone.
3. If SCAD is to fill its mission of providing information as a guide to decision making, the criterion of timely data production should be an important factor in determining the type and scope of surveys to be conducted. All studies should be scheduled in a workplan which should include a detailed timing of activities for each study ranging from the preparation of survey material, to the final data production in report form.
4. All baseline studies mentioned above should be replicated periodically (every two or three years), as they will be the only source of data available to which project impact can be compared to identify trends.
5. SCAD should coordinate and supervise all socio-economic studies conducted in the 105 project zone, including studies that are contracted out.
6. All project components, in coordination with the development of a Program Impact Evaluation System, should have an input in the preparation of SCAD's workplan. Once this workplan is finalized and approved by all parties involved, care should be taken not to divert SCAD from its track.

Annex 3

3. THE INFORMATION OFFICE

3.01. Role and Direction of SCAD

According to the PP, the role of the Information office (Service de Collecte et d'Analyse des Données SCAD), will be to carry out various data collection and analysis activities required for the monitoring and evaluation of project impact. The strategy to be implemented by SCAD was to conduct a variety of focused, small scale studies and surveys rather than broad, comprehensive surveys. The implementation schedule called for the arrival of an expatriate Senior Research Specialist to head SCAD in September of 1988.

3.02. As of December 1988, the Research Specialist has not been recruited and SCAD is not operational. However, several attempts to define a scope of work for SCAD have been made: an Information plan (Herman and Chew 1986), and a Research Agenda (Rassas and Chew 1988). Although these documents were useful in identifying the types of information that would be of general interest for the different components of the project, they were lacking an implementation strategy that would allow SCAD to prioritize information needs, as well as address the critical issue of timeliness of data production. More recently, USAID/Kinshasa (Daniell 1988) drafted a scope of work for SCAD. With a more realistic and focused approach, it attempts to prioritize information needs according to four categories: essential ongoing data gathering for project evaluation and management, non-essential ongoing data gathering for project evaluation and management, essential special studies for project evaluation and management, and non-essential special studies for project evaluation and management.

3.03. As far as local staff is concerned, the PP proposed the recruitment of 2 Zairian nationals with M.A. level degrees in research methods, and GO2 seconded staff from Plan or Agriculture. Later, the idea of secondment was dropped as it would have amounted to institution building which is contrary to the private sector approach of project implementation. At present, no Zairians have been hired or singled out to work with SCAD. However, a certain consensus has developed on the size, location, and possible staffing sources of SCAD.

3.04. Present plans envision SCAD as a small manageable unit with a permanent staff of 4 or 5 individuals based in the field (Kime), rather than in Lubumbashi as was planned in the PP. When needed, it will contract out to local or outside expertise for particular studies. Possible sources of local staffing are the sociology department of the University of Lubumbashi and the Institut National des Statistiques, although this school may close down because of financial problems. Enumerators can also be hired on a temporary basis in the project area among teachers or students on vacation. PCVs may not be available for full time data collection as Peace Corps philosophy is based on the experience of hands-on work at the village level.

3.05. Collaborative links could be developed with other data gathering agencies such as SEP (the data analysis and planning unit of the Department of Agriculture). This institution, in collaboration with the University of Leuven (Belgium), has undertaken a study on marketing of agricultural products by farmers in the Barokundi region, and is planning to conduct a similar study in Shaba. The UNDP/FAO-ZAI/84/008 data collection project could constitute another collaborative resource for SCAD.

3.06. According to the project organizational chart, SCAD is to be sub-divided into 2 units: data collection, and data analysis. The following tasks could be assigned to each of these units:

Data Collection:

- Preparation of survey material
- Identification and selection of enumerators and field supervisors
- Training of enumerators
- Field testing of survey material
- Implementation of survey
- Verification of results

Data Analysis:

- Setting up and operation of computer equipment
- Identification and selection of personnel for data entry
- Training for data entry
- Data entry and analysis.

There is no clear cut division between these units on such items as preparation of survey material or data analysis. However, as was pointed out by the CAP (Spake, undated memorandum to Chew and Rassas), the two units could be separated by setting up a data treatment office in Lubumbashi.

3.07. Present Level of Information

At present, no system is in place to monitor crop production, marketing, or transport, or farmer incomes. However a few studies provide some baseline data on these items. A study of market prospects for corn (Ariza-Nino 1986) provides baseline data on corn prices and trade in the Central Shaba region. Corn marketing data was also collected in the project zone railheads from SNCZ statistics (Mwenge 1987). A baseline survey on commercial activity in the project zone (Appleby 1987) measured development indicators. A demographic study (Verhulst 1987) of 40 villages in the Kabondo Dianda area focused on the development of a methodology to gather and analyze population data in the project zone. Furthermore, USAID/Kinshasa is planning to process the 1984 census data for the 105 project zone

3.08. Potential Difficulties

The North Shaba Project (PNS) had an information system whose performance never reached expectations. Its shortcomings can be instructive for project

105's SCAD as pitfalls to avoid. According to a PNS evaluation (Rosenthal et al. 1985), the design of the PNS information system was over-ambitious in scope, considering the amount and variety of data to be collected, and the level of experience of local staff. The same evaluators found that the information subsystem had insufficient formal guidelines to treat information requests emanating from project, or other sources, which caused it to disperse its efforts. Lastly, the validity of the data presented by the information system was sometimes questionable.

3.10. Choice of Surveys to be Implemented

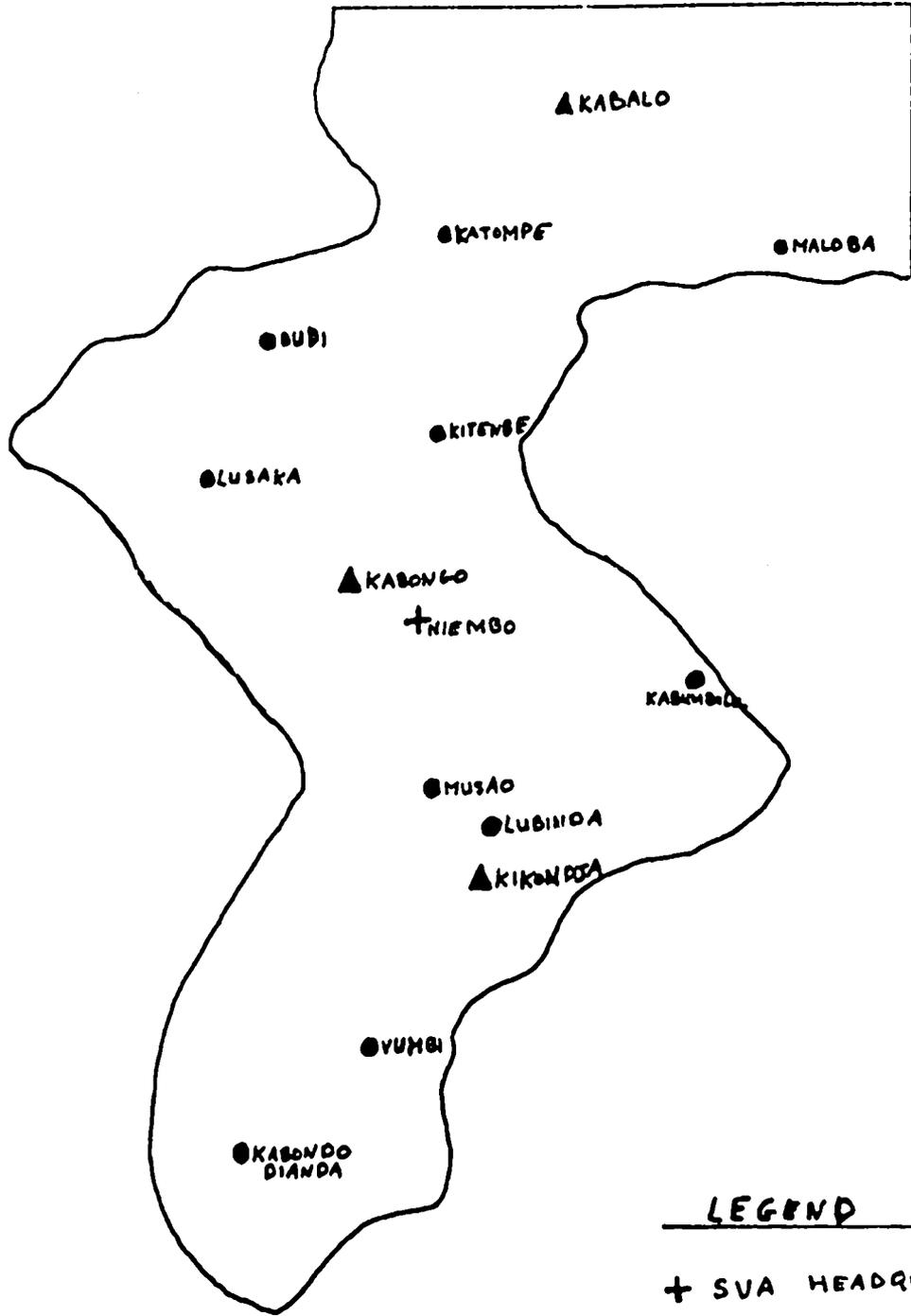
SCAD should adopt a pragmatic and realistic approach in the selection of indicators to be monitored. Several criteria should guide the choice of studies and monitoring activities to be undertaken. The decision to implement a particular survey should rest on a detailed time table indicating when the data can be available in usable form, and how it will contribute to project impact evaluation, management, or other project related purpose. The criterion of the validity of data production should also be taken into consideration. Hence, a study should not be undertaken if to ensure the validity of data would involve a level of sophistication not achievable with the resources available to SCAD. For example, this might be the case for household budget surveys to measure farmer income. On the other hand, some indicators might be looked at which, even if they were not valid in absolute terms, might reveal relevant trends over time, if measured with the same methodology over a sufficient period. Such might be the case for monitoring production of a sample of farms by recording the number of sacs of corn sold every marketing season, as well as an estimate of production of other crops.

3.11. A critical issue which will have to be addressed to ensure SCAD's efficiency has to do with the decision making process of what is essential data to be collected. The differences of approach to data collection that transpire in the scopes of work efforts that have been developed are an indication that SCAD could at times find itself in a position where contradictory guidelines on the type and scope of surveys to be conducted are issued. This is another reason for SCAD's workplan to be as detailed and precise as possible. The preparation of this workplan should include input from the following three levels:

- 1) Other components of the project such as SVA and roads;
- 2) Project management, CAP;
- 3) USAID/kinshasa oversight:
 - ARD, especially the Agricultural Analyst;
 - Program Office, especially the Research Officer, in coordination with the development of a Program Impact Evaluation System.

3.12. Once input from these sources is collected, a committee type decision may have to be made in case there are divergent views about surveys to be undertaken, or methodology to be adopted. However, once this work plan is finalized and approved by all parties involved, an effort should be made to shield SCAD from confusing or contradictory guidelines and data requests.

REPRESENTATION OF PROJECT 105 EXTENSION NETWORK



PAMPHLET ON CORN CULTIVATION PRACTICES IN SWAHILI

1. MBEKO YA KUTUMIA SHAMBANI

- Ni nzuri kutumia mbeko ya PROJET 105
- Arunaweza kutumia mbeko yako ya mavuno mapia.
- Chagua mbeko nzuri, yasiyo ohimbika au kuvunjika.
- Mbeko kubwa-kubwa yatoa mamba yenyi afia

2. KUCHAGUWA FASI ITAKUYA SHAMBA.

- Chagua udongo wenyi kuwa na mboleo nyingi.
- Usiweke shamba lako pa kiziwa ya maji
- Shamba lako lisiwe chini ya bivuli ya miti; hewa na mwangaza ni ya lazima sana kwa mihindi.



3. MATAYARISHO YA SHAMBA LAKO

- Utayarisha shamba lako wakati wa kipwa
- Ukate miti shabani mwako, kwa sababu bivuli binazuru mihindi.

4. WAKATI WA KUPANDA

- Panda mihindi yako ku mwanzoni wa mwelele (wakati wa mvua) kisha kwa mpili au tatu kubwa-kubwa.
- Panda mihindi pa wakati kunudi lote haraka nbele ya majani ya piri kuota.
- Kupanda pa wakati ni kwa lazima sana, kwa sababu ni kuepusha minge ishanbuliwa na vidudu, na magonjwa nbaimbali.

5. KANUNI YA KUPANDA SHAMBA

- Usipende Kupanda Shamba la
- Uipande mwa mstari, uachanishwa kwa bara na 75 Cm, utonganisha mabawa na 50 Cm.
- Utie mbeko tatu au mbili ndani ya shimo moja.
- Shimo isiwe ndefu zaidi; 3 au 5 Cm ya urefu inetosha.
- Unaweza kutumia 25-35 Kg ya mbeko kwa shamba la miguu nia kwa nia (1 HA).
- Ukipenda kufuata hii kuanuni utapata mavuno pengi ya kutosha.



6. KUPALILIA SHAMBA

- Kupalilia ni kwa lazima sana, kama ukipenda mbea iwe na afia nzuri shabani
- Unapashwa kupalilia mihindi wakati moja ni imeanza kusta, kupalilia kwa nyuma mno yaleta hasara nyingi shabani; na kupungukiwa kwa mavuno.
- Wakati wa kupalilia, inafaa kuochoa mbea mbili tu kwa shimo moja na inafaa kujengeza udongo ku mizizi ya mbea.



7. KUVUNA KWA MIHINDI

- Vuna mihindi wakati imeonakana ienkoea, au wakati imeona kama mbeko inakuwa na rangi nyeusi pa ile fasi inakanziyo ku kupunja.
- Usivune mihindi yako nyuma ya wakati kwa sababu mihindi yako itachinwa na vidudu; na kulika na makalo.

8. UCHAGUZI WA MBEKO YA KUPANDA MWAKA KES

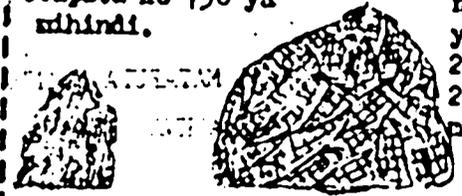
- Uchague vile vipunja vya mihindi vikubwa vikubwa vyenyi kufungana vizuri.
- Uchague vile visiyo chinwa, visiyooza, vyenyi kujaa na mbeko.
- Uikayhe vizuri juu ya kahala.



9. KATIKA SHAMBA YAKO

I) Ukitumia mbeko ya kyasili na kupandiyo ya kyasili. Utapata KG 750 ya mihindi.

II) Ukitumia mbeko ya PROJET 105 na kupandiyo yake utapata 2000 Kg au 2.500 Kg ya mihindi.



PAMPHLET ON CORN CULTIVATION PRACTICES IN FRENCH

8 PAS POUR ARRIVER AU SUCCES DE LA PRODUCTION DU MAÏS.-

1.- CHOIX DE SEMENCES.-

Il vaut mieux acheter des semences sélectionnées produites par la ferme semencière. Elles sont de bonne qualité.



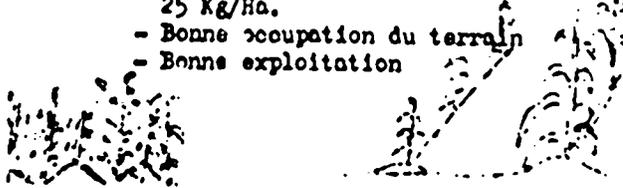
3.- PREPARATION DU TERRAIN

Bien préparer le terrain. Défriches pendant la saison sèche. Ne pas laisser trop d'arbres dans le champ, les arbres prennent la nourriture des plantes.



5.- MODE DE SEMIS

- Ne pas semer en désordre
- La meilleure façon est de semer en lignes à l'écartement de 75 Cm entre les lignes, 50 Cm dans les lignes.
- Profondeur 3 - 5 Cm
- En poquet 2 - 3 graines de semence 25 Kg/Ha.
- Bonne occupation du terrain
- Bonne exploitation



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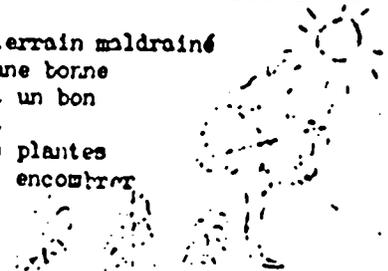
7.- LA RECOLTE.

- Récolter à maturité complète c-à-d lorsqu'il y a apparition d'un point noir à la base de la graine.
- Eviter une récolte tardive pour éviter les attaques de maïs par les insectes.
- Eviter de laisser traîner les épis sur le sol (attaque par les termites)

VARIETES LOCALES PRATIQUES LOCALES

2. CHOIX DU TERRAIN

- De préférence choisir un terrain riche en humus.
- Eviter le terrain mal drainé
- Permettre une bonne aération et un bon éclairage
- Dégager les plantes qui peuvent encombrer les maïs.



4.- EPOQUE DE SEMIS

- Après 2 ou 3 bonnes pluies (Septembre)
- Le semis lorsque le sol est humide
- Semer tôt, votre maïs profite de toute l'eau des pluies, il pousse avant les mauvaises herbes.
- Les plantes sont de bonne vigueur et résistent mieux aux attaques des insectes et maladies.

6.- SARCLAGE

- Les mauvaises herbes prennent la nourriture du sol et les maïs manquent de places pour bien pousser si on ne sarcle pas.
- Sarcler quand les herbes sont encore petites.
- Sarcler à temps
- Laisser les 2 plus belles plantes dans chaque poquet
- Butter pour permettre aux racines de mieux pousser et le plant se nourrit mieux.



8.- SELECTION DES EPIS POUR LE PROCHAIN

SEMIS

- Prendre les épis de bonne grandeur
- Bonne couverture de spathe
- Epis cueillis sur des plantes saines, normaux et productifs, bien garnis de graines.
- Sécher régulièrement vos maïs dans le foyer.

VARIETES MODERNES PRATIQUES MODERNES

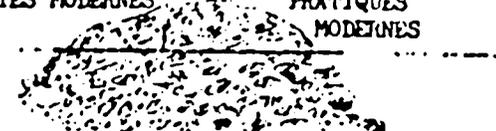


Table 2

Suggested Bulking Centers / Railhead Storage Centers

<u>STATION</u>	<u>CAPACITY (MT)</u>	<u>COVERED STORAGE</u> (not covered)	<u>BULKING CENTER</u>
Niembo	1,000		
Nyunzu	3,000	Kabeya-Mayi 1,000	
	Lengwe	1,000	
Kongolo	3,000		
Kabalo	1,000		
Nguena	500		
Kitanga	1,000	Katompe 1,500	
Kitenge	2,000		
Kamungu	2,000		
Kime	2,000		
Kabondo-Diania	500		
TOTAL	16,000		3,500

Source: Letter from Project 105 GOZ Coordinator to Project Coordinating Committee, October 13, 1988

ANNEX 4

THE SEED COMPONENT

1. TRABEZA/MBEKO SHABA: MANAGEMENT AND ORGANIZATION

Trabeza's farming experience dates back to 1980, when they started producing commercial corn for their labor force on the Kamibamba farm, which was part of the newly-purchased SMTF conglomerate. During the 1986-7 agricultural year, Trabeza produced for the first time about 40 ha of Shaba I commercial seed. Encouraged by the result and the growing demand for quality open-pollinated seed, 100ha of Shaba I were planted in the 1987-8 season for the South Shaba market.

In 1988 USAID signed a contract with Trabeza to distribute and market open-pollinated corn varieties in the Central Shaba Project area. The contract includes the technical assistance of Zimbabwe Seed Cooperative (ZSC). Trabeza also has been awarded the title of "ferme semencière primaire" (basic seed production farm) by Bunasem this year, thus having access to seed conditioning equipment at a favourable rate and a quality control laboratory on the farm.

Despite this rapid expansion, management and the assignment of responsibilities are still at a very embryonic stage. The overall responsibility for the management of Trabeza Mbeko Shaba (TMS, the seed section of Trabeza) appears to be held by Mr. Frans Couttenier; he is assisted by Mr. Wacquier, the financial manager and a shareholder of Trabeza.

Mr. Couttenier is responsible for major decisions and legal aspects. He is convinced that Mbeko Shaba is economically viable but seems not to worry about overall plans or budgets; he takes a day-to-day approach, somewhat typical for a businessman who has survived in Zaire. His son, Werner Couttenier, is a young Belgian-trained agronomist with very limited practical experience. He is responsible for seed production (field and processing), as well as the livestock operation, the horticultural project, and the new fish farming project in Fungurume. Another son, Walter Couttenier, was responsible for the seed corn distribution and marketing in Central Shaba during the 1988 selling season. He is a math graduate with no marketing training and very limited agronomic background. The third son will soon finish his MBA studies in Belgium and will be joining the Mbeko Shaba staff, hopefully strengthening general management. In addition, an Uruguayan agronomist trained in Belgium will probably be hired to establish a rudimentary development program and run the quality control lab.

The TMS staff, experienced in working in the Zairian environment; all speak Swahili and are very committed to making the seed business a success. Nevertheless, we strongly feel that management training is important. Practical training for the seed production side is also badly needed. The

biggest concern is surely the absolute lack of planning and experience in marketing and distribution. It is questionable how much Zimbabwe Seed Coop can really assist since they have little experience in seed distribution and work largely through distributor/agents. We therefore recommend a strong liaison with the extension service and the merchants to plan seed distribution activities, but we feel that extension staff should not get involved in distributing seed.

Infrastructure in Fungurume

TMS has land title for about 6000 ha, of which roughly 700 are in production. Soil quality is good to excellent consisting mainly of deep, well-drained red and black soils. Rainfall is adequate (1200 mm average). The two production farms (Kamibamba and Kasolondwe) are easily accessible, on good tarred roads; because of the farm size, seed plot isolation (secure distance to avoid contamination with foreign pollen) is easily possible. A tarred air strip is on the farm. Equipment is readily available (tractors, land preparation, planters), although it will need some addition if the size of the commercial crop increases as foreseen. However, there are frequent shortages of farm inputs (fertilizers, herbicides, fuel) due to delays in deliveries because of foreign exchange and transport problems.

The processing facilities (Heid Austria) supplied by Bunasem appear to be more sophisticated and elaborate than required. Bunasem requires ten seed sizes, while in central Shaba mechanical planters are almost inexistant. This unnecessary sophistication incurs costs which are not to the end-users' benefit. Storage facilities are in the process of being rebuilt; however, no temperature-controlled storage is available.

A quality control laboratory run by Bunasem is equipped for purity, moisture and germination testing. The future of this lab is unclear since they are planning to move part of it to Lubumbashi and staffing is not ensured.

In summary, one can surely say that the infrastructure available is ideal for a seed production site. However, the project target area is 670km from Fungurume; thus transport costs are extremely high.

2. TMS' VIABILITY PROVIDING SEED TO THE PROJECT AREA

A. 1988 sales season experience

Due largely to the eleven-month delay in the signing of the contracts with TMS and ZSC, the start of the 1988 sales season was late, especially in the northern part of the project area where the rainy season started earlier than usual. The major constraints were:

1. The key person chosen to distribute seed was the contact farmer, who was asked to handle seed sales for farmers; however, no monetary incentive was foreseen for this key person. Not paying incentives turned out to be a major weakness in the distribution system;

2. Because of the SNCZ problems, farmers asked TMS to buy the previous crop before offering them new seed;
3. TMS had planned to sell on a barter deal basis; luckily this was not accepted by farmers, since this would have caused even bigger financial losses for TMS because of the transport problems and lack of storage.
4. The seed price of 60Z/kg was considered excessive by many farmers. Since the project has just started, few demonstration plots were planted the previous season and farmers had to trust what the seed salesman promised them. Seed buying is a highly trust-based action; seeds constitute the farmer's major input, yet he will only see the results at harvest time. This is not the case with other inputs such as N-fertilizer and herbicide, where the farmer can see an effect almost immediately.
5. Seed was distributed throughout the project area. No target markets were identified and the southern region (Bukama - Vumbi - Kabondo - Dianda) turned out to be the region where farmers bought much more seed than expected.

Two major assumptions made during the 1988 sales season turned out to be wrong. The contact farmer would not distribute seed without being compensated, and the barter deal was not accepted. This fact denotes a very poor knowledge of the market place reality. In any marketing strategy, the clear identification of customers needs and behaviours is a key factor of success.

B. Lessons learned by TMS

1. The contact farmer must be given an incentive if he is expected to perform services for TMS.
2. Six target markets have been identified
 - Maloba, Kafuma, Lusaka in the north of 105
 - Vumbi, Kabondo - Dianda, Bukama in the south of 105
3. Seed production in the project area with contract growers is a must, Niembo has been identified as a good production area, about 16 ha of Shaba I, Kasai I and Salongo II are planted of these 8 ha with contract growers. Yield expectations are 40 MT of commercial seed. Payment to growers: commercial + 20%
4. An advertising campaign is planned for major target markets to create demand.
5. Constructions of 5 simple seed warehouses - depots which could be used as wholesales outlets.

C. Consequences

TMS' final 1988 sales results will be available in mid December; however preliminary results indicate the following:

1. The latest estimates set 1988 sales at 14-15 MT with a total expenditure of 10.3 Million of Zaires (7.3 sales + Distribution 3.0 Million of Zaires variable product costs) and income from seed sales 840.000 - 900.000Z plus USAID around US\$61.000 = 14.14 Million of Zaires. Total 1988 sales season figures costs
Sales + distribution 7.3 Million of Zaires
VPC 30 MT x 100Z 3.0 Million of Zaires (bought from Kaniama)
Total 10.3 Million of Zaires

Income	
Sales of seed 15 MT X 60Z	.9 Million of Zaires
US-AID 61.000 US\$	14.1 Million of Zaires
Total income	15.0 Million of Zaires
Profit	4.7 Million of Zaires
	equivalent of + US\$20.000

The reason for high variable product cost was the purchase of seed from Kaniama-Kasese.

2. During the past season, 22.000 km were travelled by truck, this means almost 1.5 km per kg of seed sold. This figure does not include the mileage to recover unsold seed. Implementing central warehousing, using SNCZ for long distance (if sure enough) where possible (Rukama, Kabongo, Kabalo) appears to be crucial. The transport from the central warehouse to the contact farmer has to be studied. Using merchants "empty transport" could be one possibility.
3. In a high inflation economy, seed inventory-unsold seed stocks are a major problem. Two additional aspects have to be addressed, transport cost to recover unsold seed, and seed viability after storage under tropical conditions (quality control). In a sophisticated seed corn market as the US, 8-15% returns are considered excellent, in some part of Europe seed return can be as much as 25-30%. For the 105 market we would see a 30% figure to be realistic; this fact clearly influences seed costing.
4. Access to quality foundation seed seems to be a major undertaking. Bunasem is apparently not able to control quality except on paper, also because the original seed stock is not properly maintained. RAV has recombined the Shaba I. To justify the existence of TMS, high quality seed stock access has to be assured.
5. Processing equipment in Niembo. If Bunasem only certifies seed which has been conditioned with their highly sophisticated and expensive component they will surely kill the seed industry. A very unsophisticated seed equipment industry exists in Zimbabwe, for next season TMS could even use the cleaner-grade they build last season.

D. Major constraints by external influences

Although the 105 market is extremely difficult to serve, we are convinced that the amount of incentive planned in the project paper is largely sufficient to implement a distribution system in the 105 area over the next 5 years. Three major constraints are identified:

1. Is the seed potential of 100 MT/p.a. realistic? i.e. farmers will buy this quantity at this high price before the extension service has made an impact.
2. No other seed company will enter the 105 market. Bunasem is negotiating with ESTAGRICO and has already installed a processing plant in Lubudi. TMS could be badly hurt if these two entities enter the market TMS developed. Both projects are funded by AID. agencies.
3. Bunasem will review its technological requirement especially for equipment and seed sizing criteria.
4. Corn prices will be at least adjusted to inflation.

3. MARKET POTENTIAL - FARMERS' NEED

1. Market Potential (Source: Project Paper)

105 Project	32.000 ha	130 - 213 MT
PNS	26,500 ha	106 - 177 MT
Kaniama-Kasese	35.000 ha	150 MT
PMKO	85,000 ha	400 - 450 MT

TOTAL Potential 178.500 ha = 786 - 940 MT Open pollinated
 Value at 1302/Kg for op 102 - 122 Million (US\$450-530.000)

The only realistic market at this moment is the 105; PNS is suspended for the time being, Kaniama-Kasese is an option once the 105 is properly served (3-5 years), and PMKO is wishfull thinking. The 105 market value is 17-27 Million Z (US\$74-118.000).

It is very likely that TMS will enter the South Shaba hybrid market (800 - 1200 MT; value US\$660 - 1 Million) before they try to enter such difficult markets as PMKO or PNS. The assumption made in the project paper that the potential seed market is 786-940 MT per year is not realistic, as long as TMS only offers an easily replicable product.

2. Demand for Improved Seed

Table 1 shows that if a 40% yield increase is achieved the first year, and this increase gradually disappears over 4 years (assuming seed storage conditions are appropriate, insect damage is limited) a farmer has a 20% increase in net return over 4 years, this at 1500 kg/ha fertility level, if the yield level is higher, the influence of seed cost is further reduced.

A farmer will have to pay 1 1/2 bag of grain (150 kg) to pay for seed, respectively 325 kg if the cost is 130Z/kg, this represents 10-22% of total returns/ha. in the first year. Spread over 4 years, it is still high if compared to Europe or the US where hybrid seed cost amounts to 6-10% of total production costs not return.

The main question remains whether the farmer can store the seed properly, so that germination and seed vigour do not suffer.

Another important aspect for the farmer is to justify the price difference (6-13x) between his grain and the seed; when the rate suggested by Bunasem for a Double Cross is 5x commercial; the maximum price of OP seed should not exceed grain by 1 : 4-5x.

A major influence on this scenario is surely given by next year grain price. If there is not a drastic increase in corn price (20-22Z/kg), we think it will be very difficult to sell the 40MT actually under production in Niembo at the price Bunasem has set (130Z/kg).

Table 1

Use of open pollinated seed - using seed for 4 years

	<u>Farmer's seed</u>	<u>Mbeko Shaba Seed</u>		
Yield level				
1st year	1500 kg/ha	2100 kg/ha	(40%)	
2nd year	1500 kg/ha	1950 kg/ha	(30%)	
3rd year	1500 kg/ha	1800 kg/ha	(20%)	
4rd year	1500 kg/ha	1650 kg/ha	(10%)	
Total	6000 kg/ha	7500 kg/ha	(25%)	
Return	60000Z	-	73500Z	+23%
seed costs				
at 60Z/kg				
At 130Z/kg	60000Z	-	71750Z	+20%

3. Seed Production Costs

Seed production outside the project area is virtually impossible because of the prohibitive transport cost and field production cost of mechanical production in Fungurume, mainly because of low seed yields and inefficiency.

If a price of 130Z/kg as given by Bunasem is acceptable to the farmer, a 15% benefit can be expected, this is very low compared to 25-35% which is normal in the seed industry worldwide.

The use of contract growers is a common practice in the seed industry worldwide, technical assistance and close supervision are of paramount importance especially since every producer can sell the OP seed directly.

Table 2

Estimated Seed Production Costs
(Z/kg)

	<u>Niembo</u> (100 MT/year)	<u>Fungurume</u> (1000 MT/year)
Field cost	12	23*
Bags	5	5
Seed treatment	15	15
Labour	20	20
Processing - Transp-Elect.	5	10
Supervision	5	5
Distribution	<u>10</u>	<u>35</u>
Subtotal	72	110
Return 25-30%	22	34
Interest 20%	<u>19</u>	<u>29</u>
Total product cost	113	176
Official price	130	130
% margin	15%	

* This figure is based on seed yield of 1.6 MT/ha which are extremely low.
If yield level is raised to 3 MT/ha this cost drops to 122/Kg.

4. Zimbabwe Seed Cooperative

The main interest of ZSC in Zaire is the hybrid seed market; especially since Bunasem appears to force local production by controlling/limiting imports of hybrid seed corn. Zaire is not part of the PTA agreement and relations with Zimbabwe are not particularly good further, the Zimbabwe Government is not really backing ZSC involvement in Zaire. The extent of commitment/involvement by ZSC in this project will depend on the outcome of the feasibility study currently underway.

At this stage, it seems that their contribution will focus on seed production aspects (agronomic, seed processing, quality control). Their training support will also mainly be geared towards these sectors; including assistance in equipment selection for processing and quality control.

ZSC stressed that the T.A. for production will clearly be kept separate since they don't want to threaten their good quality image by giving their quality label to the TMS production which they cannot directly control.

The ZSC breeding program is still very much directed at the needs of the commercial farmers in Zimbabwe, although corn acreage has experienced a dramatic reduction in this sector.

The government breeding program has redirected its priorities and is now developing material for the small scale and commercial land farmers. It must be underlined that the Zimbabwe government owns most of the hybrids which are marketed by ZSC (SR 52, R 200, R 201, R 215). Some of these, R 201 especially, are largely used in Zimbabwe low fertility/higher stress environment.

According to our information, ZSC has no ready available product which could be introduced in Zaire immediately. Mr. Caulfield, a maize breeder, will be visiting Dr. Johnson this week; it might be possible that some combination between IITA adapted material and ZSC germplasm could be available for testing next season.

The main parents of Shaba I are of Zimbabwe origin (SR 52); the others (H 632 Kenya) (Eto x Tuxpeno) are readily available. In developing a new composite or even a hybrid (non conventional variety), Zimbabwe is surely an important source of germplasm, but the conditions in 105 area are quite different from Zimbabwe (streak virus - downey mildew); thus we would not see ZSC in a position to supply a quick solution.

The TA contract signed is mainly to assist TMS in the sales and distribution aspect. ZSC pointed out that their direct involvement in this sector was limited by manpower. The person chosen for this job (Mr. Ken Banks) is a marketing assistant and does most of the promotion activities and sales planning in the non commercial sector in Zimbabwe; however all sales go through agents/distributors. ZSC direct experience in the small scale and commercial land market in Zimbabwe is quite limited.

One can say that ZSC is certainly a seed company which can supply an important input as far as seed production technology under sub-Saharan African conditions is concerned, but we question their ability to assist TMS in establishing a sales and distribution network in the 105 area.

SEED CO-OP COMPANY OF ZIMBABWE LTD.

1988 SEED PRICE LIST (LARGE PACKS SECTION)
EFFECTIVE : 1ST SEPTEMBER 1988

1. MAIZE		
a. Single Hybrids	SR52 (white) ZS233 (white) ZS225 (white) ZS227 (white) ZS107 (white) ZS202 (yellow) ZS206 (yellow) (new) RS5232 (yellow)	\$74.92 per 50kg.
b. 3 Way Hybrids	R200 R201 R215 (new) SC501	\$37.46 per 50kg.
c. 3 Way Hybrids	R201 R215 (new) SC501	\$21.00 per 25kg.
2. SOYBEANS		
Duiker/Roan Sable/Buffalo (fodder)		\$42.00 per 50kg
3. SORGHUM		
a. Hybrid	DC75 DC99	\$65.00 per 50kg.
b. Open Pollinated	Serena SV-2/SV-1	\$22.00 per 50kg
4. SUNFLOWER		
	Msasa/So209 So210/So321	\$92.50 per 25kg
5. SUNHEMP		
	Juncea	\$60.00 per 50kg
6. COFFEE SEED		
	SL28/Yellow Catuai Caturra	\$12.00 per kg

PLEASE NOTE THE FOLLOWING : -

1. All prices F.O.B. Harare.
2. Terms are strictly cash with order.
3. All payments made by cheques drawn on banks outside Harare to include 1-2% bank commission.
4. All goods consigned by public transport are at customers risk.
5. We regret that no deliveries will be made by this company.

ISSUED : 24 OCTOBER 1988
Exchange Rate Nov 1988

12\$ = 0.53US\$

REPLACES CM191/88

5. SPECIFIC TASKS

I Quality Control

Bunaseem's responsibility is:

1. Coordinate the supply of base seed to the nurseries.
2. Promoting and coordinating the multiplication and distribution of seeds.
3. Training nursery managers.
4. Insure the control of the quality of seeds.

Mid-term goals: Create official catalogue of crop varieties.

Long-term goals: Assist government in establishing regulations to support a strong private seed industry.

All this will most probably lead to a lot of bureaucracy and protectionism. Regulations are already based on EEC rules in Europe, rather elaborate crop variety testing and registration procedures are in place, which we consider far too sophisticated for this country. In fact the US seed industry views the European scheme as protectionistic, restrictive and cumbersome. Should Bunaseem continue in this direction, it could become a major negative influence on the seed industry development in Zaire.

As far as quality control for TMS is concerned, we do not see Bunaseem performing this task to satisfaction, especially if the production for 105 will be mainly in Niembo.

Producing OP varieties for an unsophisticated market requires a close supervision of physical seed quality (seed breakage during shelling/cleaning and seed purity (no foreign material like cobs, stones etc)).

This seed quality can be the yard stick for the farmer since it is a characteristic he can judge, while genetic purity is impossible to judge by looking at the seed.

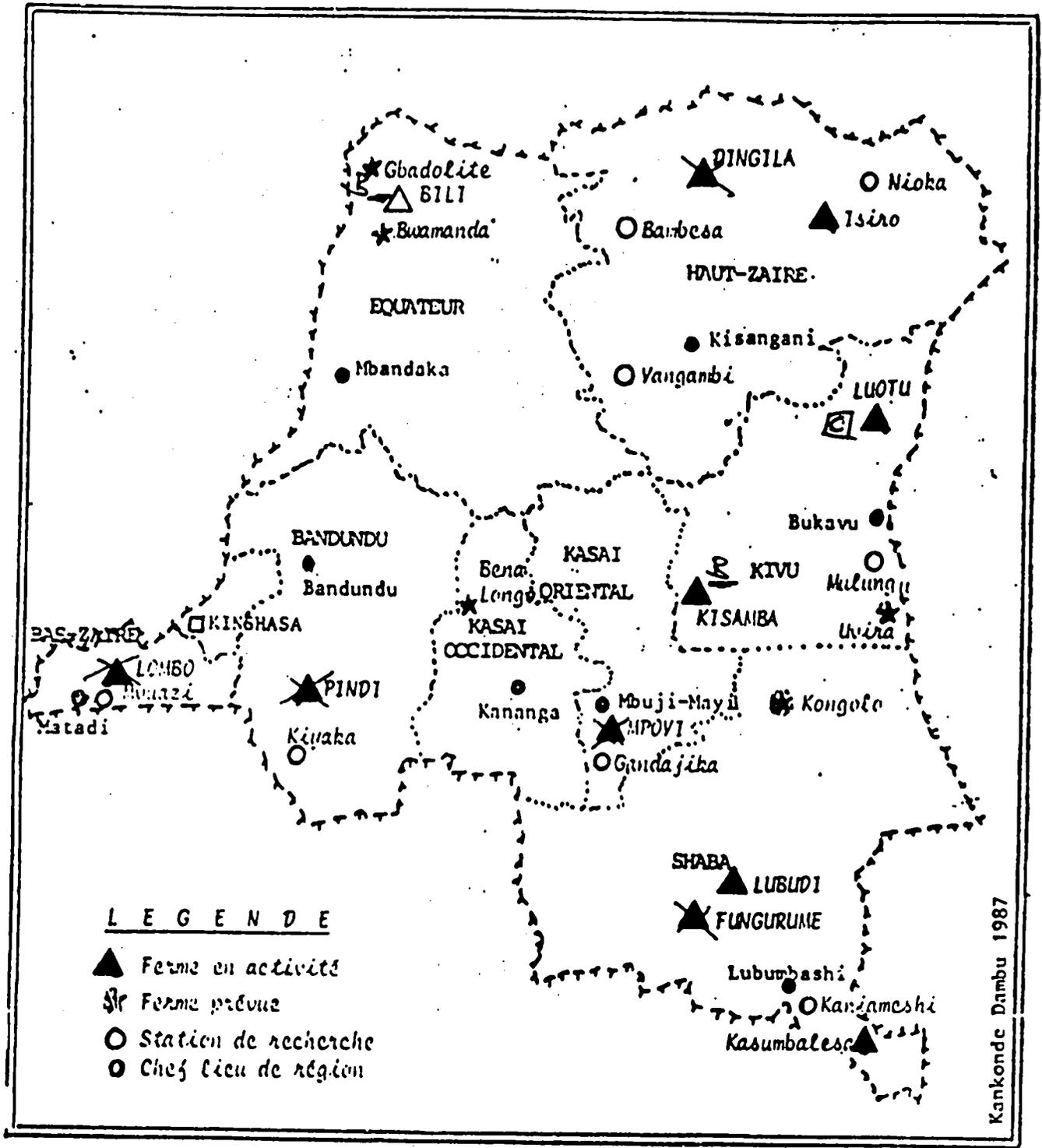
Field monitoring of a seed crop is relatively easy and depends basically on good foundation seed roughing, and sufficient isolation to avoid pollen contamination by other corn.

In the TMS market, germination is surely a major concern, especially germination of carry over seed stock and commercial seed, since environment (temperature and humidity) are very favorable for insect and rapid seed generation.

We suggest a quick germination test immediately after harvesting to separate questionable seed lots before seed processing. A final germination test is then required before certification.

92'

LA FILIERE SERRICIERE AU ZAIRE



LEGENDE

- ▲ Ferme en activité
- △ Ferme prévue
- Station de recherche
- Chef lieu de région

Kankonde Dambu 1987

During the sales season, random samples for germination should be taken by an independent person. Bunasem should monitor proper storage conditions all along the distribution chain.

Since every lot is labelled, keeping good records will help to identify possible problems.

At this stage we see two alternatives:

1. Let TMS do their own QC according to instruction given by Zimbabwe Seed Coop, taking random samples to be analyzed by Bunasem or Seed Coop.
2. Use Niembo facilities for QC on behalf of Bunasem. Lab responsibility would in this case be with 105 staff.

II Appropriateness of Varieties Selection

Major arguments in favor of OP varieties are:

1. Seed can be produced by farmers avoiding supply problems and expenses (assumption: storage used ensure vigour and germination).
2. OP are adapted to low fertility/management conditions (only partially true).

Against OP use:

1. The market is not predictable (See PNS)
2. Every farmer is a potential competitor once you sell him seeds
3. The price structure is very unelastic
4. Farmers will never be able to break the vicious circle: low seed cost - low yield and enter the cash economy
5. No seed company can survive on selling OP seed only.
6. The effect of "negative genes" cannot be eliminated through breeding.

Arguments in favor of dual approach

TMS main target is the South Shaba hybrid market. It is very unlikely that the 105 market can ever become a major cash contributor.

105 potential 100 MT (about 80% market coverage) corresponds to sales of US\$25,000 to 55,000 a year, the hybrid market in Southern Shaba is estimated at 800 - 1,200 MT at import price of \$1.10/kg i.e. \$870-1.3 Mio US.

In addition, TMS production infrastructure and headquarters are based right in the middle of this market, therefore transport costs advantage and market presence are given.

We are convinced that a dual approach to the 105 and surrounding areas has to be taken:

1. Open pollinated varieties for very low fertility - low management sector within the 105 area (realistic potential 80-100 MT a year - at break even costs).
2. Hybrid for low fertility/good management conditions with access to cash economy - especially Kasai export market and Southern part of 105.

Since the development of one or more adapted hybrids requires at least 3-4 seasons including testing, RAV will have to be closely involved. Will this approach still be possible if the hybrid institute (Yugoslavia) is created?

The actual RAV location is very unfortunate, perfect conditions exist in Fungurume to build up an efficient fully fudged Research Station. RAV would benefit through market feedback and production experience while TMS could adopt new techniques/test new products at an earlier stage. It is obvious that distance limits information exchange, should RAV not be able to overcome this distance they will always be doing a wonderful job, but nobody will ever take notice and profit from it.

It has to be stressed that a new seed is only performing once it has been successfully grown in the farmer's field and the farmer goes back to buy it, and not when it shows up in the first place in an annual report.

To speed up the product identification process, a testing program using a combination of local IITA adapted material crossed with Zimbabwe germplasm should be considered. This approach is based on the following assumptions:

1. In Zimbabwe, 3 way hybrid outyielded open pollinated varieties by 30% under low fertility conditions. These 3w had been developed for the commercial sector, thus according to breeders a 40% yield advantage for a special adapted hybrid is realistic.
2. Should it for various reasons not be possible for the farmers to renew his seed every year the F1 seed results in a 30% yield reduction, assuming a 40% gain in the first year, the yield level would still be slightly (8%) superior to first year open-pollinated seed.
3. Seed cost calculation: assuming both seed parents will have to be imported at US\$20/kg=4600Z/kg (highest cost ratio), field costs to be double than for commercial corn production and processing cost be equal for OP and hybrid, the seed cost at an average to low seed yield (2500 kg/ha bagged seed) is around 175-180Z/kg for a DC and 185-190Z/kg for a 3w. Both these figures include 39Z/kg respectively 46Z/kg for licence fee; this amounts to 28%-31% R+D contribution, when normal R+D contributions are around 6-9% maximum. (see table seed cost calculation).

Should it be possible to develop the hybrid locally, the foundation seed cost could be drastically reduced. Using Bunasem's recommended price ratio, the hybrid seed cost would drop to around 135Z/kg.

Assumptions for seed cost calculation in table:

- 1) Bunasem paid this price this season for a 3w Ciba-Geigy hybrid from Zimbabwe.
- 2) Processing according to Bunasem:

Seed treatment (Apron)	15Z/kg
Bags, labels, etc.	5Z/kg
Processing equipment/labor electricity, etc.	30Z/kg
Supervision/distribution/ carry over/interests	<u>30Z/kg</u>
Total seed cost excl/. field	80Z/kg
- 3) Suggested prices by Bunasem

Commercial hybrid seed x
Double cross 5x
3-way 8-12x
SC 12-15x
Foundation seed
SC 20-30
Inb 40-60
- 4) Seeding rate 3w (18 kg/ha SC - 7kg/ha inbred male) seed cost equals 8,000 Zaires/ha at commercial farm price 10 Zaires/kg.

Expected benefits for farmer

(see table farmer cost/benefit using different types of seed)

Assuming a DC price of 175Z/kg and a 3w price of 185Z/kg, a yield increase of 11% for a DC and 40% for a 3w over the OP first year seed.

1. High seed price even at very low yield price are justified, a 3w yielding 40% more than an OP first year seed still brings a 29% better return at 1800 kg/ha yield level. At 200 kg/ha yield level the increase in benefit for the farmer is already 30% for a 3w and equal to OP at 60Z/kg.
2. These calculations are based on a grain price of 10Z/kg. Should the grain price increase or farmers have access to higher prices (Kasai market - Lubumbashi area) the difference becomes much bigger (see return at 20Z/kg).

Comparison of Production Costs for Hybrid and Open-Pollinated Seed

	<u>3 WAY HYBRID</u>	<u>OPEN POLLINATED</u>	<u>DOUBLE CROSS HYBRID</u>
Field Cost			
Foundation Seed	100Z/Kg	17 US\$/Kg-3910Z/Kg	20 US\$/Kg-4600Z/Kg
Seed cost Z/ha	2.500Z/ha	97.750Z/ha	115.000Z/ha
Field Prod. Costs	57.500Z/ha	57.500Z/ha	57.500Z/ha
Detasseling (150hrs/ha)		1.500Z/ha	1.500Z/ha
Harvesting male rows		Compensated yield	1.000Z/ha male rows
Total field costs:	60.000Z/ha	156.750Z/ha	175.000Z/ha
Total costs (incl. 80Z/Kg Processing at different seed yield levels			
1.5 MT/ha	120Z/Kg	184Z/Kg	196.67Z/Kg
2.0 MT/ha	110Z/Kg	158Z/Kg	167.50Z/Kg
3.0 MT/ha	100Z/Kg	132Z/Kg	138.33Z/Kg
4.0 MT/ha	95Z/Kg	119Z/Kg	123.75Z/Kg
‡ R + D Contribution at 2.5 MT/ha yield level		39/142 (28%)	46/150 (31%)
Selling price incl. 25% margin at 2.5 MT/ha Yield level	131.25Z/Kg	177.50Z/Kg	187.50Z/Kg
Using foundation seed developed in Zaire			
Seed cost/ha	2.500Z/ha	6.250Z/ha	8.000Z/ha
Selling price incl. 25% margin	131.25Z/Kg	132.63Z/Kg	134.00Z/Kg

A major argument against hybrid is the annual seed renewal.

In table: yield reduction over 2 years, we assume that farmers have only access to new seed every 2 years, then a 3w will have a 50% yield reduction due to F1 seed, thus falling below farmers seed yield level, and that the OP only falls from 140% to 130%. The farmer will still have the same return over 2 years with a 3w than with the OP.

YIELD OVER 2 YEARS

1. If a farmer does not have access to new hybrid seed every year

	Farmer variety	<u>Open Pollinated MS 1968</u>	<u>Open Pollinated MS 1989</u>	<u>Double Cross</u>	<u>3 Way Hybrid</u>
1st year yield	1.500	2.100	2.100	2.325	2.940
Income deducting seed cost (at 10Z/Kg grain price)	14.750	19.500	17.750	18.875	24.775
Yield 2nd year ‡ in Kg/ha	100‡ 1.500	130‡ 1.950	130‡ 1.950	100‡ 1.500	95‡ 1.425
at 10Z/Kg (Z)	15.000	19.500	19.500	15.000	14.250
Year 1 + 2 return	29.750	39.000	37.250	33.875	39.025
Increase income over farmer seed	100‡	131‡	125‡	114‡	131‡

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FARMER'S COST/BENEFIT USING DIFFERENT TYPES OF SEED

Farmer's seed		OP TMS 1988	OP TMS1989	DC	3W
Seed cost Z/Kg	10	60	130	175	185
Seed cost Z/ha	250	1.500	3.250	4.375	4.625
Yield expected over farmer	100%	140%	140%	155%	196%
Over OP 1st year	71%	100%	100%	111%	140%
Break even	25Kg/ha	150Kg/ha	325Kg/ha	438Kg/ha	462Kg/ha
Return at 10Z/Kg (in 000Z/ha)					
at 1000Kg/ha	9.75	12.5	10.75	11.125	14.975
at 1500Kg/ha	14.75	19.5	17.75	18.875	24.775
at 2000Kg/ha	19.75	26.5	24.75	26.625	34.575
at 3000Kg/ha	29.75	40.5	38.75	42.125	54.175
at 4000Kg/ha	39.75	54.5	52.75	57.625	73.775
Assuming 1800Kg/ha at farmer seed level					
Seed cost deducted (at 10Z/Kg) return Z/ha	17.750	23.700	21.950	23.525	30.655
TMS 1988 = 100%	75%	100%	93%	99%	129%
Seed cost deducted (at 20Z/Kg) and 1800Kg/ha	35.750	48.900	47.150	51.425	65.935
TMS 1988 = 100%	73%	100%	96%	105%	135%

Since in the case of TMS this department does not exist, we strongly recommend analyzing the possibility of moving RAV to Fungurume; RAV will clearly work independantly, but a close collaboration RAV-TMS is surely beneficial for both sides.

In any case the Marketing Manager should have the possibility to spend some time either with RAV, or with research people in Zimbabwe (Ratthray Arnold Research Station or at R+SS).

Production Manager

Field Production manager

Responsible for implementation of annual production plan (quality and quantity)

- Selection of production site/growers
- Field supervision (isolation) quality control field
- Agronomic supervision, technical assistance to contract growers, (general crop husbandry, planting densities - irrigation if required)
- Planning of field activities (basic seed supply - planting dates - roughing - detasseling if hybrid production - harvesting dates)
- Seed selection in field (Ear selection)
- Annual report to general management.

Training requirements

- Seed production farm experience in Zimbabwe at planting, roughing, harvesting time
- General agronomic practices (commercial maize production)
- Fertilizer/Plant protection management
- Land preparation (seed bed)
- Equipment usage (ploughing/planter setting)
- Foundation seed/Basic seed needs
- Calculation on max/min quantities
- Yield estimates
- Extension - technical assistance to contract growers.

Factor/Production Manager

Responsible for seed conditioning/seed plant operations according to set quality standards

Training needs

- Basic knowledge about seed conditioning
 - training on equipment setting
 - Equipment maintenance and repair
- Processing supervision (Bunsem training)
 - Quality control (internal standards)
 - Quality control for Bunsem

- Inventory control
 - Storage problems - Pest monitoring
 - Records keeping
- Shipping of seed
- Organization/Control

Marketing Manager

Product Development Manager

- Responsible:
to test product developed by R+D under market conditions (information from R+D to market place)
- To establish product profiles reflecting farmer needs as a base for research activities (market place to R+D)

Training needs

- Market identification. Main characteristics of a market/market segmentation/analyzing target market.
- Testing of market acceptance-large plot testing techniques/farmers criterias in selecting new products.
- How to draw up product profiles to reflect farmer needs

Agronomic Services

Responsible for the agronomic support of field staff and internal agronomic aspects (promotion)

Well qualified agronomist with good practical experience in market..

Sales and Distribution

Responsible for implementing annual marketing plan

- Training : Basic marketing training
- Practical training by Marketing Manager ZSC

Finance and Accounting

No specific seed training for this post is required

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3. Niembo Activity

3.1. Seed Production

We strongly recommend a multicropping approach for the 105 project because we are convinced that:

- a. Crop rotation is the only agronomic practice which can maintain economic corn production in absence of fertilizer
- b. Can protect farmers against a possible decline in corn market (economic or agronomic causes)
- c. Commercial development will be more gradual if a sharp seasonality of economic activity due to corn only is reduced introducing multicropping
- d. Environmental conservation measures are easier to implement.

Since TMS will not be in a position to produce other seed than corn, we suggest Niembo continues to produce soybeans and rice seed plus cassava cuttings for the 105 market. The distribution aspect should be coordinated with TMS.

Training needs for local technicians should be analyzed, some assistance by Seed Coop might be possible.

It is recommended that Niembo also functions as a foundation seed increase farm (ferme semenciere primaire) for corn varieties used in project area; thus ensuring high quality seed stock for contract growers.

This activity would be very limited since acreage required is minimal.

Taking 100 MT as highest seed volume sellable in 105 market we require + 50 ha of seed production (including carry over of 30% average yield 2.6 MT/ha).

50 ha seed usage including strategic reserves (replanting) would be around 2.0 MT of foundation seed, this could easily be produced on 1-1.5 ha.

Table 6

Developing/Introducing and Phasing Out Products

Stage	Activity	Locations	Results	Responsibility
I	Improve genetic material	Breeding Stations	Improve breeding material, populations widening of germplasm	RAV
II	Selection of best germplasm	Breeding Station	Development of adapted material composite	RAV
III	Developing inbred lines	Breeding Stations	Testing general and specific combining ability	RAV
IV	Limited testing	4-6 locations in target market	Identify widely adapted OP or hybrids by environment and genotype interaction	RAV and Extension Service
V	Wide Testing	Number of locations in target markets which reflect different environments using small and plot trials	Identification Screening under	Extension TMS Product Development results to be discussed jointly with RAV
VI	Product introduction through demonstration plots	Select farmer leader to conduct demo plots	Test farmers acceptance Ensure feedback RAV	Extension TMS Product Development
VII	Product growth phase	Wide introduction of product	Final market introduction Ensure feedback RAV	TMS Product Development
VIII	Product Nature	Product is at its maximum	Product is at its highest volume	TMS Sales & Distribution
	Product decline	Product is substituted by better adapted one in target markets	Prepare phase out closely watch seed production stocks to avoid unsellable	TMS Sales & Distribution
	Product phase out	Product only sold in very few locations	Introduction of new product is prepared	TMS Sales & Distribution

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3.2. Varietal Testing

On station, testing activities will depend mainly on RAV's future development. Should a dual approach (OP and hybrid) be implemented Niembo would be the ideal place to run the first screening. (See table Developing/Introducing and Phasing Out Products). A close collaboration with RAV and TMS is essential.

3.3. Demonstration Plots

Niembo should continue their activity in implementing demonstration plots. these should mainly be used for extension agent training.

3.4. Adaptive Research

In collaboration with the agronomy department of RAV a long term plan defining responsibilities and activities should be established.

3.5. Staffing

Niembo's local staff must be adjusted to the farm capacity, it must at least be self sustainable.

Payment Schedule for Tonnage of Seed Marketed to Project Area
(\$ 000)

Planting Year	Tons of Seed Marketed											
	10	20	30	40	50	60	70	80	90	100	110	120
1988: 1	48	75	98	110	119	126	130	132	134	134	134	134
1989: 2	6	24	60	72	80	85	89	92	93	93	93	93
1990: 3	1	2	7	14	25	39	54	61	66	67	67	67
1991: 4	0	0	1	2	5	10	19	31	443	52	52	52
1992: 5	0	0	0	1	2	4	6	10	15	21	21	21
1993: 6 (PACD)												

Payment per Ton of Seed Marketed to Project Area
(\$)

Planting Year	Tons of Seed Marketed											
	10	20	30	40	50	60	70	80	90	100	110	120
1988: 1	<u>4,800</u>	3,750	3,270	2,750	2,380	2,100	1,857	1,650	1,489	1,340	1,218	1,117
1989: 2	600	1,200	<u>(2,000)</u>	1,800	1,600	1,417	1,271	1,150	1,033	930	845	775
1990: 3	100	100	233	350	500	650	<u>(771)</u>	763	733	670	609	558
1991: 4	0	0	33	50	100	167	271	388	477	<u>(520)</u>	473	433
1992: 5	0	0	0	25	40	67	86	125	167	<u>(210)</u>	190	175
1993: 6 (PACD)	0	0	0	0	0	0	0	0	0	0	0	0

___ Annual Project Target for Tonnage Marketed

ni not included

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8.10. PNS - General Comments

Due to heavy rain on Wednesday, November 9 only a small part of the PNS area was visited, namely Kongolo, Mbulula, Kilenge storage facilities, Ngaba seed farm.

PNS staff don't understand why the USAID collaboration had been so abruptly stopped and expressed disappointment for not having been involved in the 105 project. They hope USAID will come back or at least extend the 105 Project to include parts of the PNS.

Traders we spoke to all agreed that corn production had experienced a steady increase over the last years and that corn shipping to the railhead was much easier since the road system was upgraded. SNCZ transport problems is seriously affecting traders' confidence and might have an impact on future corn production. This did not result in a corn price increase (only Estagrico paid 12 zaires/kg. Because of higher production traders are not forced to extend their geographic coverage but can increase buying activities in their traditional territories. PNS has not contributed to increase the very poor quality of corn marketed (variability in grain type and color, insect infestation, mold corn). This very poor corn quality is probably only accepted by millers because of the shortage situation faced in southern Shaba. Nyunzu and Kongolo seem to be notorious for their poor quality. The same can be said of the corn crop in the field, variability of tassel shape and color for example is extremely high.

8.09 Ngaba Farm

The visit at Ngaba gave us the opportunity to evaluate the seed production sector in the PNS.

If the 12 ha plot of Kasai I we saw is representative of the seed quality produced by PNS we think there is a real opportunity for improvement.

The foundation seed quality supplied by PNS is apparently very poor. Germination judged by field standards (numbers of plants) is around 75-80% and plant uniformity (before tasseling) is inexistant which makes field selection (roughing) impossible.

Despite good fertilizer supply (250-300 kgs/ha of DAP - 18-46-0 at planting plus 200 kgs/ha of urea 46-0-0 topdressed) yield are rather low (about 3 tons/ha) this might be a consequence of the poor soil drainage on most of the farm.

Ngaba plus contract farmers produce between 70-120 MT of Kasai I a year. All seed is centrally processed and stored at Ngaba.

Payment to contract farmers was 10 zaires/kg which according to the responsables was 2 zaires/kg above the commercial rate. (All traders we spoke to in Kongolo had paid 10-12 zaires/kg for commercial grain.)

Processing facilities consist of a tractor powered ear sheller and a cleaner. The inappropriate use of the sheller (RPM) can cause severe germination problems, nobody seemed aware of this in Ngaba. It was unclear how ear-selection takes place since Bunasem has not yet supplied a varietal description of Kasai I. Samples are sent for certification to Bunasem, which runs germination and purity tests in Kinshasa. Phostoxin a potent storage insecticide is used, since the storage facilities cannot be properly sealed the effect of it is very doubtful. This was also stressed by the Ngaba staff which claimed that wevels were getting resistant. Unsold seed stored for next season was badly infected by wevels already.

Seed is sold to interested farmers through extension agents which are also responsible for credit, since most seed is sold on this basis.

Price for this season was 20 zaires/kg, next season price will rise to 50 zaires/kg.

Salaries and running expenses of the Ngaba operation are covered by trading commercial corn, (quality unknown), the bar (Cercle PNS) in Kongolo and car leasing for local transports.

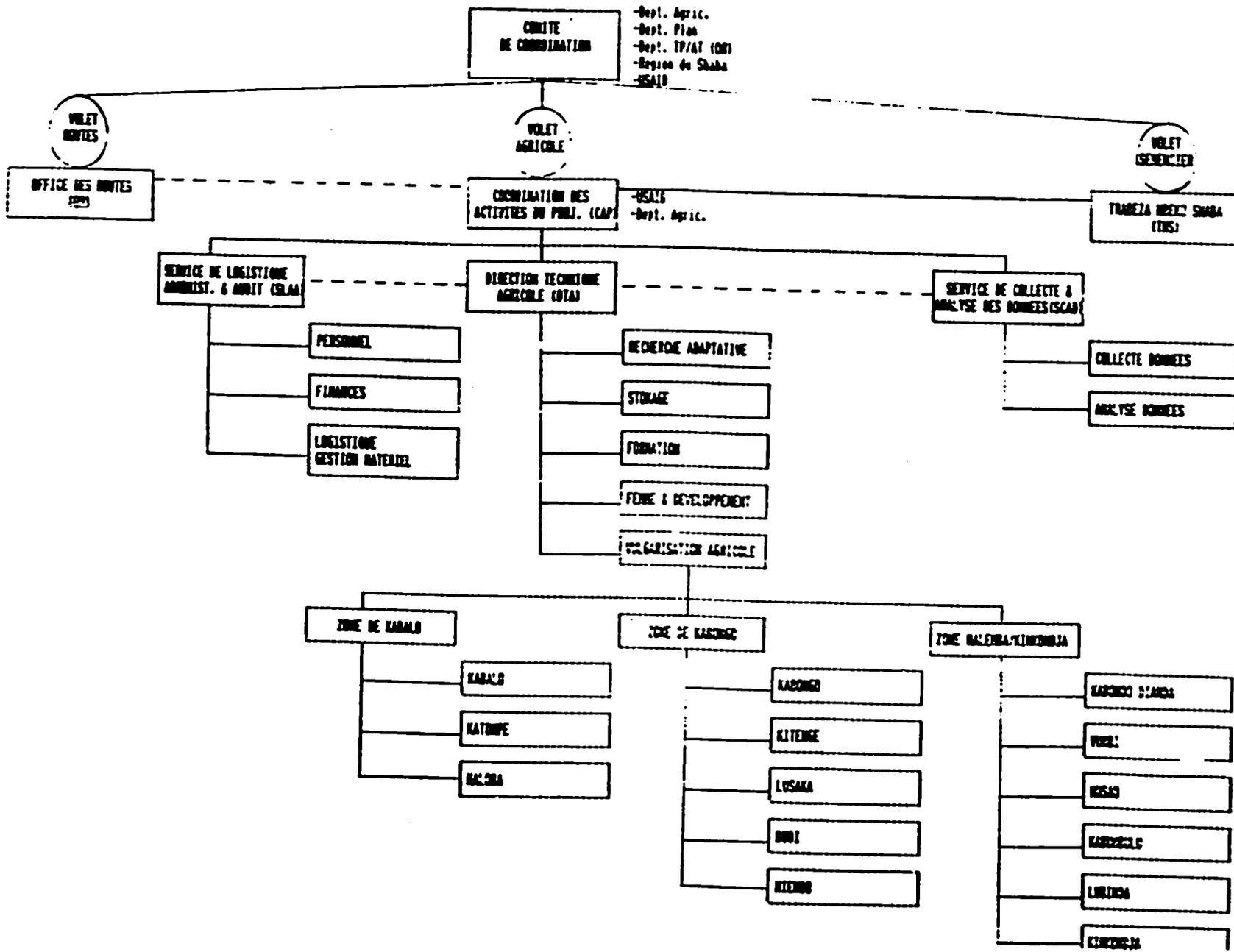
Recommendations

Ngaba can only work as an effective seed corn production center if:

1. Adequate management and supervision is ensured; (Expatriate staffing suggested)
2. Seed quality control is taken seriously,
 - * Basic seed stock is controlled by Bunasem.
 - * Seed production by contract growers is closely monitored by responsible staff.
3. Seed conditioning, storing, and distribution is improved;
4. Tight financial control is implemented

We suggest not to use Ngaba farm as a seed production farm but rather as a central conditioning and storage facility, with simple supervision and quality control infrastructure.

If the above recommendations cannot be implemented one of PNS' main feature (improved seed supply to farmers) is threatened.



PROJECT ORGANIZATIONAL CHART

EXHIBIT I

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ANNEX 5

THE ROADS COMPONENT

A. ISSUE: EVALUATION OF PROGRESS

A.1. Findings

A.1.1. The current situation of the road component is critical. The project road component as described in the Implementation Report of 30 September 1988 is approximately 12 months behind schedule. The reasons given for the delay include procurements problems with equipment, contracting delays, unscheduled maintenance activities in PNS roads and problems with technical assistance teams assigned to the project.

A.1.2. The 105 Project was authorized to proceed on August 8, 1986. In accordance with the same Implementation Report as of September 30, 1988, project output after more than two years consisted only of the rehabilitation of 100 kms of link road in Section I. The report also indicates that no feeder roads had been constructed or planned and no progress made on the acquisition of four barges required for major river crossings where bridge construction was considered to be too costly.

A.1.3. The road was personally visited by an inspection team between November 7-11, 1988. During the four day visit no road construction activity was observed. This was attributed to lack of fuels for equipment and payment to local personnel which reportedly was four months in arrears.

A.1.4. In spite of lack of maintenance and construction activities several Roads Bureau newly acquired vehicles were passed on the road transporting materials and purchasing corn for resale both of which appeared to be non-project related, commercial activities. A Roads Office water truck was passed; however, no construction activity was noted. The only project activity which seemed to be in progress was the construction of the base camp for Section II at Kime. This latter activity is being funded directly with CPF.

A.1.5. On November 19th, the Kabongo base mechanic informed that he had received shipment of two tank loads of fuels but most of the shipment was destined for other entities in the area.

A.1.6. During the report period, the Roads Bureau failed to make minimal scheduled local currency contributions destined for payment of local salaries and fuels.

A.2. Conclusions

A.2.1. Delays in the road component are impacting negatively on agricultural outputs. There is some question as to whether 1989 corn production and seed distribution schedules will be met if the road infrastructure is not in place.

A.2.2. There is no possibility of recuperating lost time until local funding problems related to collection of fuel taxes for payments of project local costs are resolved.

A.2.3. There appears to be a non-authorized utilization of Bureau of Roads vehicles for non-project purposes, even though local funding for fuels is not available. This could be attributed to non-payment of salaries with the result that Bureau of Roads employees have to find alternative methods to obtain compensation.

A.3. Recommendations

A.3.1. Every effort must be made to solve the fuel tax problem so that adequate and timely funding of local salaries and purchase of fuels can be made. The implication to the project are such that A.I.D. should provide temporary financing through local PL-480 counterpart funds for these items in the event that fuel tax problem is not resolved by the end of 1988.

A.3.2. The road construction program should be rescheduled on a rational basis taking into account additional resources to be received in the form of heavy equipment and attempt to accelerate or "crash" the program if possible.

A.3.3. Tighter controls and better enforcement of utilization of Bureau of Roads project equipment is required to ensure the use of these units are not diverted for non-project purposes.

B. ISSUE: PROJECT SCHEDULING

B.1. Findings

B.1.1. Any programming must take into account that there is considerable possibility that part of the 1989 corn and other agriculture production will be lost unless the actual road network is improved to the point that it at least is passable by truck traffic even though not necessarily at its final desired service level.

B.1.2. Approximately US\$15,000,000 worth of heavy equipment donated by A.I.D. and Japan will be made available for the project which will permit probably the formation of from two to four integrated work crews depending on the time of the arrival of this equipment.

B.1.3. Project workloads, estimated production rates and estimated construction time assuming 2, 3 and 4 crews for three different scenarios are indicated in the attached sheets.

B.2. Conclusions

B.2.1. There is a need for an immediate emergency repair program on both the link and feeder road network to rehabilitate sections of the network which are currently not passable in order to permit evacuation of projected 1989 agricultural surpluses in the project area.

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B.2.2. Depending on the timing of equipment arrival and the ability to put these crews to work simultaneously in the field, the estimate to complete (exclusive of emergency repairs) is from 2 to over 5 years. A best guess estimate considering projects inputs and the fact that the major US\$6.0 Japanese drop of equipment is not scheduled until 1990, is a 3.0 year estimate to complete in the event only priority feeder roads are rehabilitated and 4.0 years if the additional 597 kms of secondary feeder network are added to the rehabilitation program. If all the roads currently contemplated including the 160 kms of link road currently scheduled for completion by the private are to be rehabilitated by force account, then we probably are talking about a 5 year program.

B.3. Recommendations

B.3.1. The first order of priority is to stop all rehabilitation work and form emergency repair crews with the equipment available. These emergency repair crews would immediately rehabilitate all sections of link and feeder road in the project area which are currently not passable with the intention that as much of the road network be opened to traffic to permit evacuation of the 1989 harvest. Roads sections requiring emergency repair should be identified and quantified. A emergency repair program should be established based on equipment units available and priorities in evacuation of agricultural products.

B.3.2. Once the emergency repairs have been completed, then equipment units can be regrouped and assigned to programmed normal road rehabilitation activities. These crews should be balanced with proper equipment/labor balance and sufficient haul units to maintain an efficient operation depending on haul distances. Crews should be designed for production rates on the order of 20 kms/work month for link roads and 30 Kms/work month for feeder roads.

B.3.3. The program should include the rehabilitation of the 597 kms of secondary feeder road which would increase estimated to complete time to four years. The 160 kms of link roads comprising Section III should remain with the private sector and should not be done by force account even though higher costs are incurred. Preliminary analysis of amount and timing of equipment available indicate that the completion date would be extended from 4 to 5 years if Section III were done by the Roads Bureau. Higher costs are traded off for more expeditious completion.

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PROJECT WORKLOADS

LINK ROAD

The Link Road was initially divided into the following sections:

Section I	Kongolo-Ebombo-Katshi	220 kms
Section II	Katshi-Budi-Kabongo-Musao	395 kms
Section III	Musao-Mwanza-Malemba-Nkulu- Kabondo Dianda-Mukulakulu	390 kms
	Total	<u>1,005 kms</u>

Subsequently because of budgetary restraints the link road was divided into the following approximate sections:

Section I	Kongolo-Ebombo-Katshi	220 kms
Section II	Katshi-Budi-Kabongo-Musao	395 kms
Section III	Kikise-Mwanza-Malemba-Nkulu- Kikondja	160 kms
Section IV	Kikonija-Kabondo Dianda- Mukulakulu	230 kms
	Total	<u>1,005 kms</u>

Sections I, II and IV will be rehabilitated by the Roads Bureau on a force account basis. Section III is scheduled to be let to a private contracted selected by international bidding.

FEEDER ROADS (see attached listing)

Feeder roads have been divided into three classifications:

1. First Priority OR Roads to be rehabilitated and maintained by the Roads Bureau	817 kms
2. First Priority SNRDA Roads to be rehabilitated by the Roads Bureau but maintained by SNRDA	94 kms
3. Secondary Priority RP Roads proposed but not yet approved for rehabilitation by the Roads Bureau	<u>597 kms</u>
Total 1 + 2	911 kms
Total 1 + 2 + 3	1,508 kms

PRODUCTION RATES

Current crew production rates on Section I for the link road are about 10 kms per month when no major restraints are incurred. It is estimated that by expediting field work with good logistic support and production incentives this crew rate could be doubled to 20 kms per month. The estimated production rate per crew for the feeder roads is estimated at 30 kms per month. A calendar year is considered to have about 9 months of working time available.

NOTE: At the time of the report 100 kms of link road had been completed and zero kms of feeder road.

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ESTIMATED CONSTRUCTION TIME

Summary of Estimated Months to Completion

Case I	Two Crews	45 months
745 kms Link Road	Three Crews	29 months
911 kms Feeder Road	Four Crews	23 months
Case II	Two Crews	59 months
745 kms Link Road	Three Crews	39 months
1,508 kms Feeder Road	Four Crews	28 months
Case III	Two Crews	64 months
905 kms Link Road	Three Crews	42 months
1,508 kms Feeder Road	Four Crews	31 months

SECTION I

OR	Katshi-Kabalo	88 kms
	Kabalo-Nyunzu	130 kms
	Nyunzu-Kongolo	176 kms
	Kongolo-Kivu Border	47 kms
	Total	<u>441 kms</u>
RP	Kabalo-Kasinge-Maloba-Luizi	158 kms
	Kabwela-Kabi-Kilomboyi-Mwehu-Kiyumbi	72 kms
	Kukula-Mukila Pofui	86 kms
	Lukula-Kabwela	18 kms
	Total	<u>334 kms</u>
SNDR	Kasinga-Kende	25 kms
	Kasinga-Kabula	13 kms
	Total	<u>38 kms</u>

SECTION II

OR	Kakuyu-Kidimu-Ankoro-Kikoko	139 kms
	Kombakomba-Fuela Katombe	56 kms
	Kitenge-Mwadi Katoloka	239 kms
	Total	<u>434 kms</u>
RP	Kamungu-Lenge-Kitenge-Pompo Beya	140 kms
	Masangu-Kabongo	32 kms
	Mwambai-Niundo	41 kms
	Total	<u>213 kms</u>
SNRDA	Mambela	56 kms

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SECTION III

RP	Kabondo Dianda-Vumbi	72 kms
	Kisanga-Lubondo	41 kms
	Kabumbulu-Kikose	34 kms
	Mwanza-Kabumbulu	43 kms
	Total	<u>190 kms</u>
OR	Mwanza-Kabwe	26 kms

Case I Current Situation (Nov. 1988)

A. Link Road to be done by force account (1,005 kms - 160 kms)	845 kms
Work completed to date	<u>100 kms</u>
Feeder Road remaining	745 kms
Link Road to be done	911 kms

For two crews

A. Link road	$\frac{745}{2 \times 20}$	19 months
B. Feeder road	$\frac{911}{2 \times 30}$	<u>15 months</u>
	Work months	34 months X $\frac{12}{9}$
	Calendar Months	45 months

For three crews

A. Link road	$\frac{745}{3 \times 20}$	12 months
B. Feeder road	$\frac{911}{3 \times 30}$	<u>10 months</u>
	Work months	22 months X $\frac{12}{9}$
	Calendar Months	29 months

For four crews

A. Link road	$\frac{745}{4 \times 20}$	9 months
B. Feeder road	$\frac{911}{4 \times 30}$	<u>8 months</u>
	Work months	17 months X $\frac{12}{9}$
	Calendar Months	23 months

Case II Assume Secondary Priority Roads are included in Feeder Network

A. Link Road (1,005 kms - 160 kms- 100 kms)	745 kms
B. Feeder Roads (817 + 99 + 517)	1,508 kms

For two crews

A. Link road	$\frac{745}{2 \times 20}$	19 months
B. Feeder road	$\frac{1,508}{2 \times 30}$	<u>25 months</u>
	Work months	44 months X $\frac{12}{9}$
	Calendar Months	59 months

For three crews

A. Link road	$\frac{745}{3 \times 20}$	12 months
B. Feeder road	$\frac{1,508}{3 \times 30}$	<u>17 months</u>
	Work months	29 months X $\frac{12}{9}$
	Calendar Months	39 months

For four crews

A. Link road	$\frac{745}{4 \times 20}$	9 months
B. Feeder road	$\frac{1,508}{4 \times 30}$	<u>12 months</u>
	Work months	21 months X $\frac{12}{9}$
	Calendar Months	28 months

Case III Assume all Roads to be constructed by force account

A. Link Road (1,005 kms - 100 kms)	905 kms
B. Feeder Roads	1,508 kms

For two crews

A. Link road	$\frac{905}{2 \times 20}$	23 months
B. Feeder road	$\frac{1,508}{2 \times 30}$	<u>25 months</u>
	Work months	48 months X $\frac{12}{9}$
	Calendar Months	64 months

For three crews

A. Link road	$\frac{905}{3 \times 20}$	15 months
B. Feeder road	$\frac{1,508}{3 \times 30}$	<u>17 months</u>
	Work months	32 months $\times \frac{12}{9}$
	Calendar Months	42 months

For four crews

A. Link road	$\frac{905}{4 \times 20}$	11 months
B. Feeder road	$\frac{1,508}{4 \times 30}$	<u>12 months</u>
	Work months	23 months $\times \frac{12}{9}$
	Calendar Months	31 months

C. ISSUE: EVALUATION OF RISKS ASSOCIATED WITH DEPENDENCE ON SNCZ RAIL SERVICE TO EVACUATE AGRICULTURAL SURPLUSES

C.1. Findings

In a meeting held with Mr. Stroyman, Operations Manager of the SNCZ in Lubumbashi on November 18, 1988, the following items and details were presented.

C.1.1. Freight rates as currently authorized by the GOZ for agricultural products are on the order of Z. 1.5 per ton-km (US\$0.0065 at Z.230/US\$). Rates vary slightly depending on haul length. Actual costs to the railroad are currently between Z. 18.0 and Z. 20.0 per ton-km (US\$ 0.0872 to US\$ 0.087). Costs of transport by truck currently are about Z. 35.00 per ton-km (US\$ 0.152) or about twice the unsubsidized rail freight charge. Truck rates between Z. 25 and Z. 45 were quoted. The current operation deficit is therefore on the order Z. 18 or US\$ 0.0782 per ton-km. In accordance with these figures the rail transport in North and Central Shaba is being subsidized at a rate of Z. 1.5/Z. 20.0 or 7.5% of actual costs.

C.1.2. SNCZ currently hauls about 400,000 metric tons of agricultural products over their network with an average transport distance on the order of 500 kms. This represents an annual deficit to the operation of 400,000 X 500 X \$ 0.0782 or US\$ 15,600,000. Total annual revenues of the SNCZ are only about \$ 87,000,000 or Z. 20.0 billion. The agricultural subsidy represent a substantial burden on the railroad operations.

C.1.3. The current capacity of the railroad in North and Central Shaba is about 25,000 tons per month. Considering that agricultural surpluses resulting from the project are expected to be on the order of 160,000 metric

tons of corn and corn flour alone (not considering other agricultural products), a period of at least 6 months would be required to evacuate these surpluses by rail.

C.1.4. The current constraint on increasing capacity is not on wagons but rather locomotives. The number of wagons available is indicated below for 1988:

August	400
September	560
October	750
November	700 (projected value)

A distribution problem is encountered in that empty wagons are sent back to Lubumbashi where they are kept and not always expeditiously returned to railheads and made available for freight purposes. This was being corrected.

C.1.5. The locomotive problem is the major constraint. Both diesel and electric locomotives are used over the Shaba network. As lack of foreign currency precludes heavy capital investment in additional locomotives, they are currently being rented from South Africa at the rate of \$750 per day payable in foreign currency. South Africa, however, refused to continue renting these locomotives because payments by the SNCZ was considerably in arrears. Recently about US\$1,000,000 was made available for payment and South Africa has renewed rental agreements.

C.1.6. The SNCZ was not in a position to guarantee the shipment of agricultural surpluses from the project area because it depended not only on railroad facilities and rolling stock but on other factors such as: storage capacity prior to loading; storage capacity after unloading at the mills; speed of loading and unloading and an estimate that at least 20% of the corn shipped is composed of waste and contamination. All these aspects have presented problems in the past years. There is also the problem of preferences as priorities are given to more profitable haulage of minerals rather than deficitary agriculture products.

C.1.7. The major problems of SNCZ as indicated by Mr. Stroyman were:

- Prior to independence, the rail operation was privately owned and profitable. Rates on copper and tin ores were favorable and reinvestment in line maintenance and rotation of rolling stock was adequate.
- After independence, confidence decreased, and the private owners made only minimal, short term reinvestments. The railroad was nationalized in 1974 and SNCR created as a parastatal organization to take charge of the operation. Loss of income increased as SNCR had to incorporate deficit operations in the northern lines at Kivu and Haut-Zaire. Furthermore, the profitable Lobito line was closed resulting in a loss of 1,000,000 tons of freight and well as Zambian copper exports which created revenues of approximately US\$1.5 million annually.

- The SNCZ is required to maintain a paternalistic type of organization supporting schools, hospitals and other non-railroad social infrastructure and at the same time pay taxes on revenues to the GOZ. Approximately Z 1.0 billion is spend on medical benefits for employees and another Z 1.0 billion in corn flour subsidiens to employees.
- Current tariffs for minerals are acceptable although not always actualized promptly but not sufficient to compensate for subsidized agricultural transport.
- Over twenty years have passed without substantial maintenance on the line or renewal of railroad rolling stock. Negotiations were currently being held with potential donors but that the result would be dependent on the GOZ to accept some restructuration.

C.1.8. Mr. Stroyman indicated that in spite of the serious problems expected, the railroad operations in 1989 should be improved in the North and central Shaba areas and he expected less problems in evacuation of agricultural surpluses.

C.2. Conclusions

C.2.1. The current railroad operation is deficitary due primarily to have transport subsidies paid to shipment of agricultural products. Without major capital investments in the form of foreign loans for line improvements and renovation of rolling stock and elimination or at least reduction in freight subsidies, the railroad is not likely to provide efficient transport services particularly like those in North and Central Shaba where deficitary agricultural produce is the major rail transport freight item. Current negotiations for external financing will probably require that railroad rates be actualized that subsidized agricultural rates for agricultural products be reduced or eliminated. This is a long term affair. The short term perspective for improved railroad transport services are not favorable considering the current financial crises in the GOZ.

C.2.2. Considering the short term perspective for improved railroad service to be negative, the immediate priority would be to provide the necessary storage facilities along the railheads so that the 160,000 tons or more of agricultural surpplus can be stored for about a period of six months allowing the railroad to evacuate this surplus was existing capacity. The alternative of reallocating rolling stock from other lines to transport agricultural surpluses in the Shaba area at current deficit rates is not a viable transport alternative.

C.2.3. The high subsidies on agricultural products shipped by rail is not only resulting in a deficitary operation for the SNCZ but also distorting the transport system. A more efficient network could be developed under competitive market arrangement. Long distance truck hauling of agricultural product which currently is prohibitively expensive at subsidized railroad rates could possibly be made competitive. Current truck rates are only about twice that of unsubidized agricultural rail costs. In addition to transport

charges, the railraod mode must consider other costs such as loading and unloading, storage, delivery of truck to and from rail heads which could be reduced or eliminated by long distance haul by truck over the improved link road network. Truck transport could possibly be made to be a competitive private sector alternative to a heavily subsidized parastatal rail network.

C.3. Recommendations

C.3.1. As improvements in services of rail operations cannot be relied upon in the short term, it is essential to give priority to construction of storage and handling facilities at railheads so that agricultural surpluses can be stored for the 6 month period required by current resources available to SNCZ to evacuate these excesses. It appears to be great concern to get the road system working so that excess 1989 production can be delivered to the railhead. However, unless adequate storage is provided at the same time, this surplus will just rot at the station and the 1988 situation repeated. Both road and storage building must be integrated.

C.3.2. Current negotiations with donors for capital investments in new rolling stock and line improvements will probably be dependent on structural changes in railraod operations including the elimination or at least reduction in subsidies to agricultural products. This could result in making long distance truck haulage a competitive transport mode for agricultural surpluses if all factors involved in the transport system are considered, i.e. hauling, storage and handling. A transport economist should be contracted to perform such a study with a sensitivety analysis on how competitive a trucking industry would be by reducing or eliminating railroad agricultural subsidies. This recommendations should then be incorporated into project design analysis.

D. ISSUE: **EVALUATE RIVER TRANSPORT BETWEEN MALEMBA AND BUKAMA AS AN ALTERNATE TRANSPORT MODE**

D.1. Findings

D.1.1. One of the alternate or complementary transport modes which could be considered for evacuation of projected agricultural surpluses in the project area is the Lualaba River link between Malemba and Bukama. Bukama is currently an important transport mode as the link road, electrified section of the SNCZ railraod and the river all meet at this point.

D.1.2. The river mode would still depend on truck traffic to haul surpluses to Malemba for transfer to river barges. The produce would then have to be reloaded on the electrified train line at Bukama for transport to markets in the Lubumbashi area. The advantage of the river mode would be that it could reduce overland truck haul distances normally required to railhead in the eastern part of the project particularly as the Manono zone on the west side of the Lualaba River has been reincorporated into the project area.

D.1.3. Constraints on using the Lualaba River is that it would require initial and periodic maintenance dredging as well as markings to define the channel. USAID reportedly has financed programs in Zaire where low draft barges have been designed for hauling by river tugs. These barges could be incorporated into project design.

D.1.4. Private sector investment has been reported available for barge transport purposes if the initial investment in weed clearing, dredging and channel markings is made.

D.2. Conclusions

D.2.1. The possibility of utilizing river transport between Malemba and Bukama as a complementary transport mode deserves study. The trade-offs on the multi-mode system are complicated and input data including costs not available. A transport economist is required to develop most efficient transport networks under different scenarios and tariff structures.

D.3. Recommendations

D.3.1. A transportation economist should be hired as soon as possible to develop most efficient multi-mode transport models for the project area. The result of these studies should be considered in project redesign.

E. ISSUE: EVALUATION OF ROAD DESIGN STANDARD AND QUALITY OF WORK PERFORMED

E.1. Findings

E.1.1. Standard profiles for the link and feeder roads dated June 1, 1986 are attached along with the revised criteria for the link road as modified on May 16, 1988. The link road is a two lane, all weather system with a travel speed of 60 kph. The link road is a one lane, earth road with a travel speed of 40 kph. Maximum vertical grades are on the order of 8%. One lane bridge crossings are contemplated for both networks except for major river crossings (4) where ferries will be used.

The design standards and plans prepared by Louis Berger International, Inc for the 160 kms of Section III were not available for review. Reports, however, indicate that a somewhat higher quality design level had been adopted.

E.1.2. Only the link road network could be evaluated during the field inspection trip as no link roads have yet been completed to design standards. The following observations are applicable only to the link road:

- The quality of the surfacing, both in-situ and imported, seemed to be quite good in spite of the fact that no formal laboratory testing procedures are currently used to determine physical properties. The imported laterites and lateritic gravels as well as the natural sand-clay materials found principally in savannah areas were considered adequate for the low volume traffic with ADT value of 5 to 10 on the link road and 1 to 5 on the feeder roads. At these low traffic volumes no major corrugation of the surface was observed. Dusting was reported to be a problem in the dry season. Trucks seemed to be able to negotiate the steeper grades even when the surfacing was moist, i.e. lack of traction on a wet, slippery surface did not seem to be a problem. Bullock carts and

other animal-drawn transport does not exist in the project area which reduces the maintenance problem. Bicycle transport of dried fish and other commodities, however, is common.

- Section I link roads currently are being built without formal compaction with rollers and water trucks. Compaction by equipment and traffic only was being relied upon. The results appeared to be satisfactory. Reportedly, compaction equipment and water trucks will arrive with the equipment scheduled for rehabilitation of Sections II and IV, so that any deficiencies should be corrected.
- In some sections of the completed road the width of clearing as specified on the standard sections did not seem sufficient to daylight the road so that the sun could dry the surface after rains.
- Cross culverts are being utilized rather sparingly and substituted whenever possible with diversion ditching. The spacing on these diversion ditches seemed inadequate.
- One major problem to be anticipated is that trucks currently using the road do not normally carry tire jacks. When a flat tire is repaired, the chassis is blocked up and a hole dug in the surfacing, under the tire to permit the spare to be placed. The hole is not always backfilled and compacted with adequate material.
- Cross sections stipulate triangular longitudinal ditch sections which are easy to build and maintain by mechanized equipment. It may be that when labor-intensive maintenance methods are substituted for equipment, the triangular section will have to be changed to a trapezoidal one. The latter have greater hydraulic capacity for a given wetted perimeter and are more easily maintained by hand labor crews.
- The utilization of lined ditches was not being contemplated. However, several sections of completed road were observed where excessive ditch erosion had taken place which could have been corrected had lining or ditch checks been specified as part of the rehabilitation procedure.
- A major problem was the longitudinal erosion of surfacing material on longitudinal grades which exceed the cross fall. Surface runoff instead of being evacuated to the longitudinal side ditches, ran longitudinally along the wheel path depression causing erosion and gullies in the surfacing material.

E.2. Conclusions

E.2.1. The current standards as being utilized for the link road appear to be in excess of that which can be justified solely on the basis of traffic volumes. Most guidelines for rural road construction recommend the construction of all weather two lane roads for ADT values of about 150 or more. The current ADT level on these roads is 5 to 10 and certainly will not reach 150 vehicles during the project design period.

The utilization of a two lane, all weather facility apparently has been justified by the fact that all the benefits generated depend on getting increased agricultural production to the railheads where it can be transported to consumption centers. The nationalization appears to that road standards should not be tied to traffic volumes, as the road network depends on increased agricultural production not on traffic for feasibility. Utilization of a two lane, all weather link road system is considered necessary for this purpose. Another factor is that trucks because of age and overloading breakdown frequently on the road. Four cases were encountered during the field inspection trip. With a one lane facility, these trucks effectively block the road to other traffic until such a time repairs can be made. With a two lane road this problem can be deminished or avoided.

E.2.2 The quality of the construction on the link road as measured by travel time is considered satisfactory. On completed link road sections vehicle travel speed as measured in the 4-wheel drive Landrover, well exceed the 60 kph minimum criteria established. As no feeder roads were visited, the corresponding travel time could not be determined.

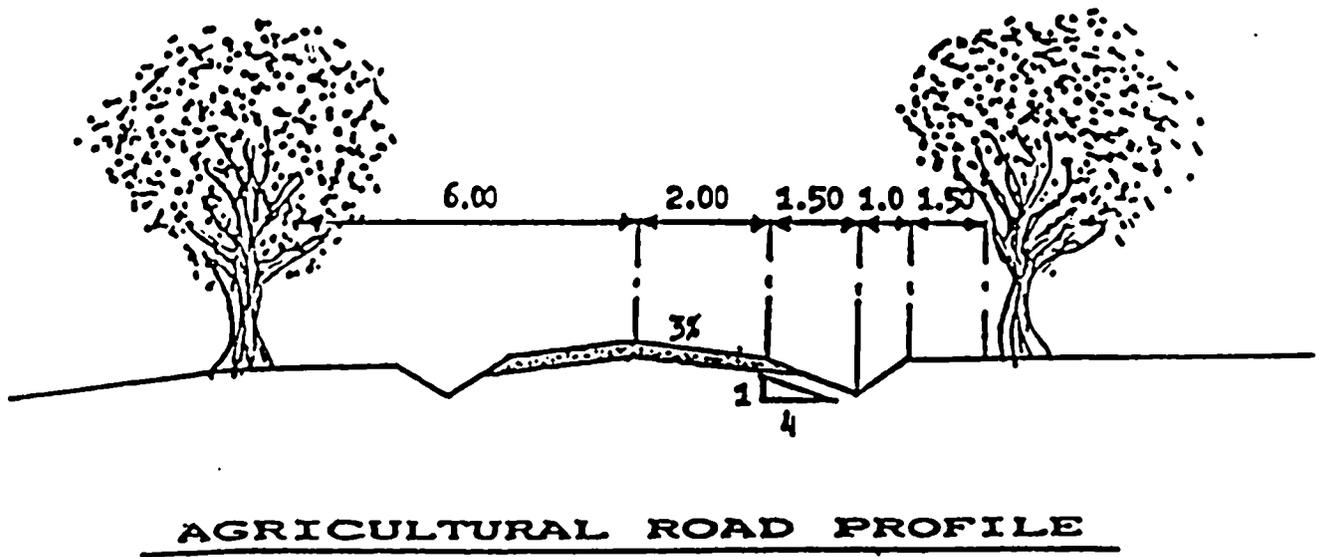
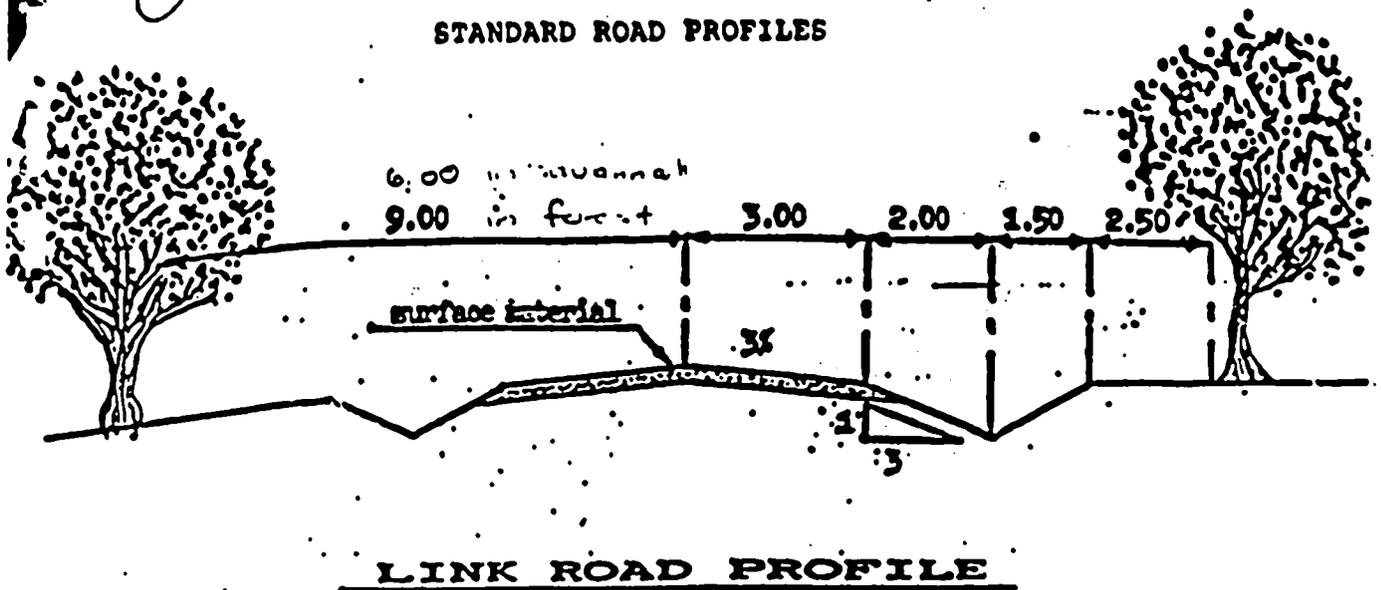
E.3. Recommendations

E.3.1. The utilization of design standards for the main link road should be reviewed by a transport economist to insure that a two lane, all weather facility is required. It would seem that for the entire road network to function correctly, that both the feeder and link roads have equal importance in insuring that agricultural surpluses get from production centers to railheads. Products are intended to move more generally in a east - west direction over feeder roads to railheads rather than in a north-south direction along the main link road. Do we really need an all weather, two lane link road system for project implementation or would it make more economic sense to design the entire road network using feeder road criteria and upgrade later when justified by traffic increases?

E.3.2. The general impression was that minor improvements could be made in the rehabilitation procedures which would reduce maintenance and road user costs with an overall transport cost saving. These include:

- a. Decreasing spacing on diversion ditches to permit more evacuation of runoff in the longitudinal drains.
- b. Construction of ditch lining or check dams on sections of the road where erosion is excessive.
- c. The possibility of stabilizing longitudinal surfacing on steep grades with say two bags of cement per cubic meter of surfacing to reduce longitudinal erosion.
- d. Wider clearing of roads in forested areas to insure the road surface is dried by the sun.
- e. More reconstruction rather than rehabilitation of existing road sections which are existing roads constitutes nothing more than a channel dug out of the existing ground.

SECTION VII
STANDARD ROAD PROFILES



Notes:

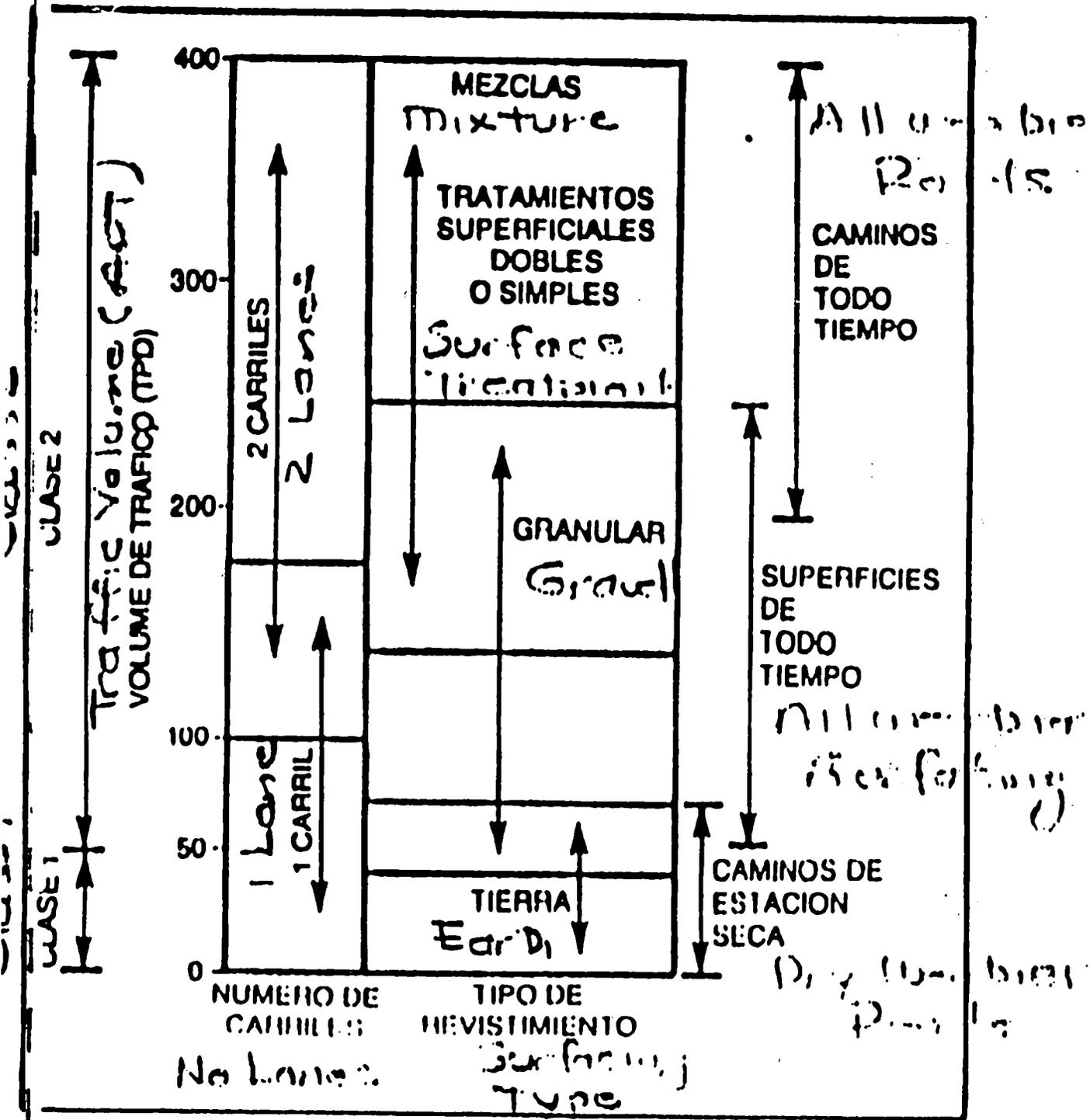
- Link Road to have 65% select surface materials
- Agricultural Roads to have 95% insitu surface materials

PROJECT CENTRAL SHABA
STANDARD ROAD PROFILE
ROAD REHABILITATION
A.Clark: _____ P.Infelice: _____ Jun: 1, 1986

Guía de selección de pavimentos y tipos de tráfico

function of traffic

Figura 1. Guía para determinar el número de carriles de circulación y los tipos de revestimiento relacionados con los volúmenes de tráfico.



Citoyen Lukusa Mwengula
PDG
Citoyen Londala Malela
Administrateur Directeur Technique
Offices des Routes
Direction Générale
Kinshasa/Gombe

Subject: USAID Grand AID 660-0105, Central Shaba Agricultural Development
Project, Project Implementation Letter No. 13

Citoyens,

This Project Implementation Letter, in conformance with the Grant Agreement signed between our two governments on August 29, 1988 specifies an amendment to the cross-sections for the link road as specified in the Project Paper.

The original cross section as called for in the Project Paper proposed an eighteen (18) meter right of way as presented in the attachment (Figure A). The proposed change calls for a twelve (12) meter right of way in the savannah areas and an 18 meter right of way in forests (Figure B). Your approval of this change and other technical modifications as presented in the attachment to his letter, shall be indicated by your signature below.

Please retain one original copy of the French and English versions and return the others to USAID.

Dennis M. Chandler
Director

Attachment: Cross sections diagrams

Londala Malela
Administrateur Directeur Technique

Lukusa Mwengula
Président Délégué Général

Draft: PDO:HBemis _____
 PDO:RBraden _____
 ARD:DBrown _____
 PRM:JBierke _____
 D/D:JGoodwin _____

105p11, no patn, page 1

F. ISSUE: EVALUATION OF ACTUAL AND PROPOSED ROAD MAINTENANCE SYSTEM

F.1. Findings

F.1.1. The actual road network on the Central Shaba project is receiving basically no maintenance. No signs of Roads Bureau maintenance crews were observed during the field visit. Some maintenance is being done by road rehabilitation crews in Section I which divert road construction equipment to maintenance when road deterioration reached critical levels.

F.1.2. The basic criteria established in the Project Paper was that roads rehabilitated under the program would be maintained as a temporary measure by mechanized construction crews assigned to the rehabilitation program. However, an institutionalized labor intensive road maintenance program would be initiated to replace the mechanized crews. There was no evidence that after more than two years of elapsed project time that such a labor intensive program was being considered, designed or implemented. Unfortunately, the Project Paper recommends such a system but provides no criteria as to how the system should be designed, implemented, or financed.

F.1.3. It is redundant to say that road maintenance is more important and has higher economic returns than road construction and rehabilitation and should be given priorities. Furthermore, road maintenance on unpaved roads must be applied immediately after construction to preclude premature road deterioration. The roads being built are currently not receiving any form of organized maintenance.

F.1.4. Experience in other African countries as expressed by the AID office in Kenya has demonstrated that for low volume traffic roads a intensive labor intensive routine maintenance program of filling potholes, localized surfacing replenishment and attention to drainage will prolong the life of the road indefinitely and reduce or eliminate the need for costly periodic maintenance in the form of surface replenishing. The Kenya labor intensive labor maintenance program developed by the British has been used as a model for application in other countries and has formed the basis of economic studies by the World Bank and others in the development of road cost models.

F.1.5. Labor intensive road maintenance procedures are not new to Zaire having been employed successfully in the project area as channalized through local missionary organizations, PVO, and NGO usually acting through the village chiefs. The basic inputs required for the implementation of such a program is available in the project area, e.g. availability of surfacing materials relatively flat or rolling terrain without much rock; local organizations through which to channel such programs and most important a communal spirit which facilitates implementation of these programs. The most serious constraint appears to be the relatively scarcity of population particularly along the feeder road networks which may require special treatment. Probably no one system can be implemented in the entire project level. This decision to use man/km, permanent maintenance gangs, travel maintenance gangs or labor contractors would depend on the characteristics of each road section.

F.1.6. Although the current system still exists whereby villagers are required to work one day of the week voluntarily on communal projects, the system is not uniformly applied except for special projects. There still is a stigma to this system dating back to the colonial period when such a system was in effect. Road maintenance labor will have to be paid (current rate reported in the field is \$0.30/day), supplied with tools and given a certain amount of training. Animation at the village level is also usually required.

F.2. Conclusions

F.2.1. The basic road maintenance strategy as proposed in the Project Paper of utilizing project equipment for road maintenance temporarily until a labor intensive system can be introduced is correct and the only procedure which has a chance of becoming self sustaining.

F.2.2. Unfortunately, the system has to be designed. Labor crews have to be setup with estimated production rates, the network had to be divided into sections as assigned, labor intensive procedures require small quantities of support by equipment mainly for transport of materials which must be provided for; villages must be organized, supervision and control measures introduced. Nothing along these lines has been done. The roads currently being rehabilitated in Section I should have already been organized for labor intensive maintenance long ago. Instead unsuccessful contract maintenance procedures have been attempted.

F.3. Recommendations

F.3.1. Efforts be made immediately to implement the labor intensive maintenance program which forms part of project design. If the design cannot be done internally, then a private consultant should be hired for this purpose. Implementation including purchase of hand tools, provision of supplementary equipment, village animation, training can be done by field engineers and trainers assigned to the project. The Kenya Roads Offices could be visited to determine what procedures have been successfully applied their for possible application in Zaire.

F.3.2. It is important that an adequate control and monitoring system be implemented to insure funding is properly utilized and workers are actually paid.

F.3.2. The labor intensive maintenance program may be expanded at some later date to include labor intensive penetration road construction to reach areas which have considerable agricultural potential but are not yet being developed because of lack of access.

G. ISSUE: ASSESSMENT OF THE TECHNICAL TRAINING CENTER FOR THE ROADS BUREAU IN LUBUMBASHI

G.1. Findings

G.1.1 The Technical Center was visited on November 16, 1988 and the center's activities described by the Director, Citoyen Tshitenda Kabundji.

- The Center currently offers classroom courses for:

Mechanics
Equipment Operators and Drivers
Civil Engineers
General Administrators, such as typists, accountants
Project Administrators

The courses are staged with a length of 1 to 3 months. Participants are sent back to the district offices of the Roads Bureau for practical application of classroom instructions prior to advancing to the next stage. Courses are included both for beginners and for experienced personnel who require actualization.

- The school currently has 62 students with an overall capacity to recycle 350 students per year.
- Participants are limited to Roads Bureau employees who are giving food and lodging while attending these courses and some form of nominal compensation for their time.
- The annual budget is about \$160,000 which is only slightly higher than the cost of assigning one expatriate advisor to assist the school. The current financial crisis is affecting the school. Although salaries of instructors are being paid, the 60% health benefit is not. Students are also not regularly receiving compensation for time spent.

G.1.2. A Japanese financed program will be introduced next year whereby an equipment drop with technical assistance will be made available to the school for training purposes. The school will be actually assigned a section of road to maintain using this equipment, student operators and mechanics with supervision from school instructors. This will obviate the need to send students back to the districts for on the job training.

G.1.3. AID current support of the school consists of the following:

- About US\$80,000 in local CPF to support additional training of experienced operators and mechanics for the new equipment to be purchased under the program. This training is complementary to that supplied by equipment suppliers.
- A project training advisor (24 months) whose spends about half of his time in the field and the other half at the school on training programs.

- A regional trainer (24 months) whose salary is charged to the project but rotates throughout the Shaba district on all Roads Bureau training program.

G.1.4. The school is capable of setting up special training programs as required and in the past has trained instructors who are sent out into the field to implement labor intensive road maintenance programs.

G.1.5. It was interesting to note that the school does not have the problem encountered in most other countries, i.e. students who have been trained leaving the Roads Department to accept higher paying position in the private sector. The students remain with the Roads Bureau apparently because of limited employment possibilities elsewhere.

G.2. Conclusions

G.2.1. The current training program of the school appears to be oriented primarily to theoretical classroom instructions rather than practical on-the-job experience. This may change under the Japanese program whereby field training will be provided.

G.2.2. The school seems to be obtaining adequate financing from other sources. The only real financial shortfall at the time the school was visited was for local expenses.

G.2.3. The school does not have the problem of most countries that trained employees leave for other jobs creating the need for a continuous replacement program. The schools primary activity appears to be recycling of existing employees.

G.2.4. Other than training of operators and mechanics for the new equipment, the labor intensive road and maintenance program does not require high expertise. The basic principles are easily learned. Practical experience is valued more highly than advanced academic degrees. Furthermore, the maintenance program will require only training of villagers in the field which cannot be done at the school headquarters.

G.3. Recommendations

G.3.1. The decision to support or not support the school with additional AID funds would depend on whether the AID objective is to improve the overall technical quality of Roads Bureau employees in the Shaba District or limit such support to that which will benefit only the project. If only projects benefits are described, then:

- The 220 million allocation (US\$80,000) should be retained.
- The services of the project training advisor should be retained in order to implement training programs for labor intensive maintenance crews.
- All other training inputs should be dropped including that of the Regional trainer.

G.3.2. If AID wishes to improve the overall capacity of the Roads Department, than this should be funded separately and not included as a rider on the current 0105 program.

H. ISSUE: RATIONALE FOR SECTION III ROAD WORK

H.1. Findings

H.1.1. Section III of the project was previously defined as the rehabilitation of 390 kilometers of road between Musao-Mwanza - Malemba Nkulu-Kabaondo-Aianda-Mukulakilu. The work was intended to be done by a award to a private sector contractor based on international bidding. Because of budgetary constraints and additional drops of heavy equipment from the Japanese, the decision was made to reduce the length of this contract to 160 kms to include the more difficult section of road between Kikose-Mwanza-Malemba Nkulu-Kidonja. The remaining 230 kilometers was to comprise a new section IV between Kikondja-Kabondo Dianda-Mukulakulu which was to be included in the force account network to be rehabilitated by the Roads Bureau.

H.1.2. The Roads Bureau estimate for doing the work using project equipment was approximately half the price of expected bids from private contractors. It is not quite clear whether equipment ownership costs (amortization and interest) were included the Roads Bureau estimate or not. However, there is no doubt that with the donated equipment, financial costs, without considering equipment ownership costs, for force account work to be considerably less than contract amounts. The work could be done cheaper by a well organized Road Bureau with adequate logistic support.

H.1.3. On the other hand the work load to be done still has not been defined. The decision to add 500 to 800 kms of second priority feeder road rehabilitation to the program has been proposed but not approved. If agreed to, then considering a 30 km per month production rate and a 9 month/year work season, it would take one construction crew between 22 and 35 months to complete. The additional work load is substantial and there is doubt that even heavy drops of equipment available are sufficient to equip the rehabilitation crews to complete the project within the three year construction period generally desired.

H.1.4. One of the objectives of the Program is to stimulate the local private construction industries from large firms to small labor contractors. The only current aspect of the project which is available to large contractors operating in the area is the Section III rehabilitation program. If this is gone by force account, then this stimulus no longer exists.

H.2. Conclusions

H.2.1. The decision to award the section III contract of 160 kms to private sector contractors or do it by force account would appear to be dependent on whether the decision to include 500 to 800 kms of secondary feeder road into the rehabilitation program.

H.3. Recommendations

H.3.1. If the additional workload of 500 to 800 kms of feeders road is included in the contract, the decision should be to leave the 160 kms of section III with the private sector even at higher costs. Delays to the overall project will result because of insufficient equipment to complete the program expeditiously. In addition, this private sector construction will insure compliance with one of the objectives of the program which is to stimulate the local construction industry.

H.3.2. If the additional 500 to 800 kms of feeder road are not added to the contract, then serious consideration should be given to doing the work by force account provided that all potential delays concerning the road tax problem and funding for fuels and local salaries is resolved.

I. ISSUE: IMPACT OF CORRUPTION ON THE ROAD COMPONENT

I.1. Findings

I.1.1. Conversations with project personnel and local expatriate businessmen in Zaire has indicated that corruption is not only prevalent in road construction but also endemic in all phases of commercial activities in Zaire. It has become institutionalized and people accept it as a normal form of doing business. In fact, probably commercial activity would be seriously curtailed if corruption (defined as non legalized payments) were to be eliminated because normal businesses cannot be run profitably without ways to expedite procurements. In these sense not all corruption can be considered as undesirable but rather as a necessary evil.

I.1.2. Corruption on road projects takes the form of illicit payments for road contracts (estimated to be from 5 to 30% of the contract price). More specific examples have been cited whereby a railroad tax collected for use in road construction and maintenance disappeared. When explanations were requested, the information was considered a state secret which could not be released. Labor contractors on road maintenance projects have been reported to collect payment and then not pay employees. AID in Lubumbashi had to place counterpart funding for local costs under their direct control because of diversions. Padded billings and attempts to pass these through accounting controls are prevalent.

I.1.3. A certain amount of what can be called low key systematic corruption such as diversion of equipment for non-related, project purposes probably can be defended when consideration is given to the fact that salary payments are four months in arrears.

I.1.4. AID in Lubumbashi feels that sufficient control are in place to preclude large scale funding diversions of project funds. However, the Agency can express concern but cannot intervene when local funding intended for the project is diverted even though this diversion may affect project outputs.

I.1.5. Although corruption in some cases can be a beneficial in most cases it produces negative impacts:

- Kickbacks on private sector construction result in higher road construction costs, longer delays and lower economic returns.
- Improper allocation of resources may result, e.g. large road construction projects may be implemented because chances of kickbacks are greater rather than on low level maintenance programs which result in higher returns but less.

I.2. Conclusions

I.2.1. Corruption in Zaire is prevalent and not likely to disappear and attempts to control such will be difficult particularly when the project ends and AID controls are removed. This affects long term project sustainability.

I.2.2. The answer to just how much corruption can be tolerated before a project is to be abandoned is not an easy question to answer.

I.2.3. Corruption plays an important part in project design. For example, labor intensive maintenance programs are very susceptible to misappropriations as apparently been the case on other projects in Shaba. Unfortunately, strictly controls and more frequent audits are helpful but not always sufficient. These will have to be applied to the 0105 Project.

I.3. Recommendation

I.3.3. Aside from the continued application of AID controls and design of projects to minimize possibilities of diversions of funds, the only real solution is a long term one whereby officials are judged by their performance and constrained to consider performance as their first duty rather than chances for personal gain. This has happened in certain parts of the world but will take a long time in coming in Zaire.

J. ISSUE: ASSESSMENT OF ROAD SECTORS WHICH ARE MORE LIKELY TO BE MAINTAINED INDEPENDENT OF GOZ/OR/DONOR SUPPORT AFTER THE COMPLETION OF THE PROJECT

J.1. Findings

J.1.1. Conversations with AID personnel in Lubumbashi who have lived in the area for many years and know local conditions, indicate the communal programs at the village level will work and that villagers will join together to do road projects including maintenance.

J.1.2. Road maintenance, however, presents a on-going continuous obligation. A school can be built by communal labor in six months and the village communal obligation basically terminates. A road, however, must be maintained on a permanent basis and it is hard to incentivate people to work forever for nothing. A successful road maintenance program must provide for nominal payment to serve as an incentive.

J.1.3. Recent evidence is that roads will be more likely to be maintained by local communities when they have played a decision making role and participated in the construction. This is a major argument for a decentralized rural road maintenance structure with decision making made at the local level rather than dictated from a central Road Bureau type organization.

J.2. Conclusions

J.2.1. The project area is relatively homogenous and cannot be divided into sectors based on topography, geology, or other factors which would significantly make road maintenance more difficult in one sector than another.

J.2.2. The basic factors which determine the success of a on-going maintenance progra will be nominal incentive payments for work performed, promotion of maintenance programs at the village level, and decentralized organization which will incorporate villagers into the program.

J.3. Recommendations

J.3.1. To facilitate implementation and continuity of the proposed labor intensive road maintenance system the factors indicated above should be taken into account in design of the program.

K. ISSUE: **ASSESSMENT OF SHOP FACILITIES AND PROCUREMENT OF SPARE PARTS AND FUELS**

K.1. Findings

K.1.1. Conversation with field shop personnel in the Project area confirmed that one of the major constraints to effective utilization of equipment was the selection and availability of spare parts. The following observations are considered applicable.

K.1.2. Shop in Kongolo - Visited on November 7, 1988

- The lead time on spare part procurement was reported to be one year or more.
- Requisition for spare parts sent to Lubumbashi are often "lost" or not acted upon with the result that the same requisition has to be repeated one or more times.
- Critical spare parts ordered with new equipment do not arrive with the equipment.
- Critical spare to be shipped with equipment are selected by the dealers and do not always correspond to requirements in the field.
- Existing shop facilities are deficient and must be shared with PNS. Requirements include repair of the roof, more shelf space for spare part inventories, a Kardex system for control of inventories.

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- Only eight mechanics are available for 120 equipment units. Three additional mechanics were required. The general capability of the mechanics was considered to be satisfactory. Mechanics had not been paid for one month. Repair tools are practically non-existent.
- Equipment units as ordered were not always appropriate for terrain conditions. Example: Mack trucks with reinforced suspensions had been ordered, however, ordinary suspensions were more than adequate. The reinforced suspension were causing excessive maintenance problems.
- Some of the components for new equipment ordered were lost in shipment. New equipment had been deadlined until these components could be found. Other components had been damaged in shipment.
- Batteries as received were often not useable.
- No system was available for engine cleaning.
- Equipment units were currently being scavanged in order to obtain spare parts to keep other equipment running.
- No coveralls for shop mechanics were available.
- Although adequate fuel storage facilities were available, only minimum supplies were received. Currently no fuel was available for operation of equipment. Fuel reserves to cover emergency situations could not be maintained.
- Effective equipment management systems for equipment and spare parts had not been introduced because there were no resources available on which to base such a system.
- Parts catalogues on which to base spare part orders were not always available for the equipment units available.
- The quality of equipment operators sent from Lubumbashi was marginal with the result that equipment was abused at times. Operators required more practical experience.
- Morale at the base camp was extremely low and key expatriate personnel were seriously considering leaving the project.

K.1.2. Base camp in Kime - Visited November 8, 1988

- This base camp is currently not operational but scheduled for completion in November, 1988 and will be used to support road rehabilitation and maintenance activities on section II.
- The results here are impressive. The camp including repair shops, warehouses, living quarters, infrastructure etc has been constructed in about seven months at a cost of \$357,000 equivalent

utilizing PL-480 counterpart funding. The facilities are excellent. Although space for repair of equipment is limited, additional bays can be added as required.

1988. K.1.3. Road Bureau Central Shops in Lubumbashi - Visited November 16,

- Again the major obstacle here in availability of spare parts. Although a spare part inventory is maintained stocks are inadequate.
- Critical, fast moving spare parts as ordered with equipment does not always correspond to needs. Spare part inventories are replete with spare parts which are used only occasionally.
- Lead time on spare part acquisition was reported to be as long as two years. The reasons given were that local suppliers in Lubumbashi and Kinshasa did not maintain adequate inventories. Lead time for acquisition of required spare parts abroad combined with bureaucratic delays was excessive.
- Some relatively new equipment was observed being scavenged in order to obtain spare parts to keep other units moving.
- The only one low boy was available for transporting equipment from the central shops to the field offices in the Shaba district.
- The quality of local mechanics available to perform shop repairs was reported to be excellent. Again, repair tools were in short supply.
- Currently no funding was available for purchase of local spare parts.
- Equipment repair facilities, although adequate in some respects, was still useable. New ship equipment was observed apparently of Japanese origin.

K.1.4. Flow charts for procurement of spare parts in both local currency and U.S.\$ are attached.

- The procedure for local procurement appears to be working well but is limited in application due to non-availability of parts on the local market. A local petty cash fund is maintained which can be used for the direct purchase, without competitive price quotations, of up to \$1000 equivalent in spare parts. For local purchases between \$1000 and \$5000, three competitive quotations must be obtained, however, this requirement is easily waived in the event three suppliers are not available. For purchases over \$5000 equivalent, Kinshasa approval is required.
- For procurement of larger orders of spare parts in US\$ the system is more complicated as indicated in the flow chart. The two principal delay points appear to be SGMPT of the Road Bureau in

Lubumbashi and the Commodity Management Office (CMO) of AID in Kinshasa. The SGMPT does not diligently process spare part requisitions or expedite approvals. The CMO office of AID in Kinshasa was originally setup only to handle project 0105 requisitions but has been expanded to handle purchases of all AID contracts in Zaire. The Office appears to be understaffed and unable to expedite procurements.

K.2. Conclusions

K.2.1. The expeditious procurement of spare parts and fuels is a major deterrent to the successful completion of the road component. The problem on the fuels is simply lack of local funding for purchase. Ample transport and storage facilities are available to keep equipment units in the field supplied. The spare part problem is more serious. Although procedure for local procurement are expeditious, due to lack of local supplies only a small fraction of the needed parts can be obtained in this manner. Most of the spare parts must be obtained from suppliers overseas. Current acquisition procedures are excessively time consuming and must be facilitated if the roads component is to be completed satisfactorily.

K.2.2. The importance of expeditious funding and good organizational procedures has to be emphasized. The Kime Base Camp is a good example of where adequate local counterpart funding along with good management procedures produced excellent results in spite of severe logistic problems. The situation is not impossible and can be made to work.

K.2.3. The major problem which needs attention is to maintain adequate inventories of fast moving spare parts based on maximum-minimum systems and expedite overseas procurement procedures so that non-critical spare parts can be procured expeditiously when required.

K.3. Recommendations

K.3.1. A local hire expatriate be contracted to work in the SGMTP office in Lubumbashi with the express purpose of facilitating and coordinating spare part procurement on the 0105 Project.

K.3.2. The operational procedures and staffing capacity of the CMO be reviewed to determine what procedures or additional personnel must be introduced in order to reduce lead time on spare part orders.

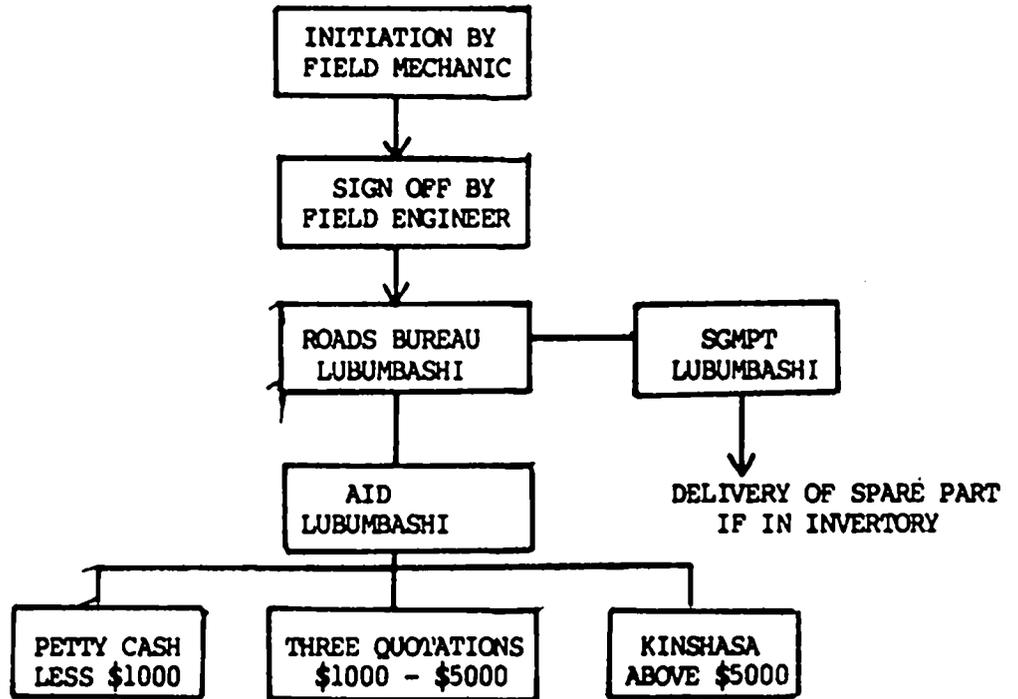
K.3.3. Expediting services are reported to be available in the private sector whereby spare parts can be obtained from overseas outlets in a matter of weeks. The cost of this service is reported to be reasonable. This service should be investigated and if found functional included as part of the procurement procedure.

K.3.4. Inventories of critical, fast moving spare parts should be reviewed at SGMTP and the local base offices to determine just what parts are required on a regular basis. Existing stocks should be supplemented to include these parts and a maximum-minimum system setup with reasonable lead time to provide for renewal.

K.3.5. Equipment suppliers should not be depended upon to provide critical spare parts which are ordered with equipment. This listings should be made or at least reviewed by local superindentents and mechanics to determine applicability based on local experience.

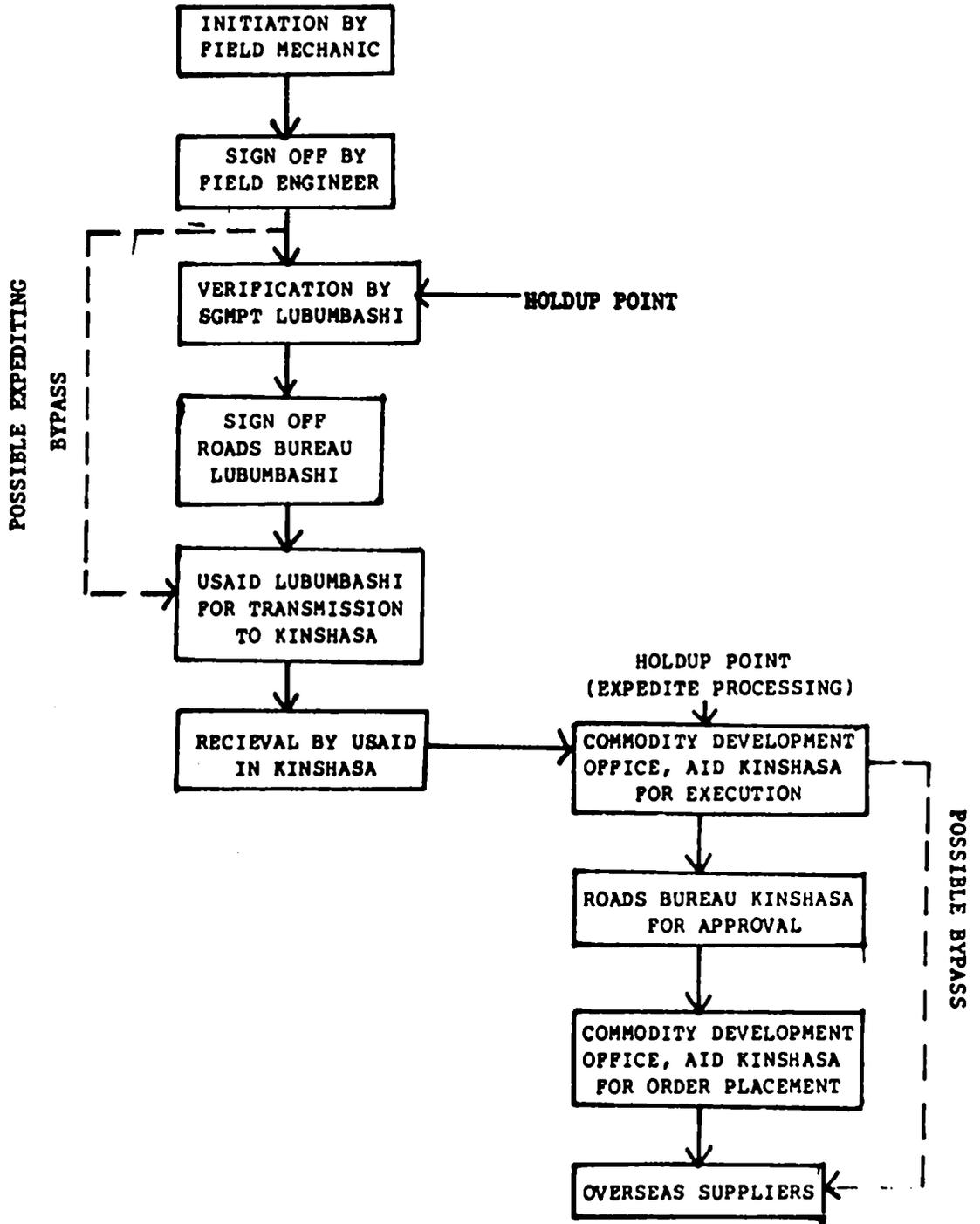
K.3.6. Kardex systems be setup at the base camps in the field for inventory control. Effective equipment maintenance and repair management procedures be established.

FLOW CHART FOR PROCUREMENT OF SPARE
PARTS PAID IN LOCAL CURRENCY



NOTE: SYSTEM WORKS WELL. NO ADJUSTMENT REQUIRED

FLOW CHART FOR PROCUREMENT OF SPARE PARTS PAID FOR IN US DOLLARS



L. ISSUE: SUSTAINABILITY OF ROAD COMPONENT

L.1. Findings

L.1.1. Sustainability as applied to roads must be defined before it can be assessed. General concepts as applied to roads are that in the case of an existing, inadequate and deteriorated network as found in the project area, the existing roads are rehabilitated, improved or reconstructed to the desired service level and then maintained throughout their life by a combination of routine and periodic maintenance. The rehabilitation program is a one-shot affair, not to be repeated. The sustainability issue therefore applies to the maintenance aspects which must be applied on a continuing basis. Unfortunately, the theory breaks down in practice as maintenance inputs are not applied with a gradual and often rapid deterioration of the road system. Maintenance in effect, then becomes a continuous series of externally financed rehabilitation programs which are applied only when the road condition reaches the critical stage where the road becomes almost impassable and pressures are built up to reconstruct the road. For this analysis the sustainability issue is treated as a maintenance problem, i.e. an evaluation of what is required to obtain a self-sustaining project maintenance organization which will operate on local funding only and not be dependent on outside grants or loans.

L.1.2. Considering actual institutional arrangements whereby the Roads Bureau is responsible for all road maintenance on a national level, the question of sustainability cannot be resolved at the project level but must be considered on a macro basis. Project sustainability could be obtained simply by diverting resources from other roads districts to the project - robbing Peter to pay Paul. However, this is not a solution. The methodology is not complicated and is invariably addressed in procedures contemplated as part of maintenance management systems, e.g. estimating total maintenance workload; calculation of costs; estimating resources available; calculation of financial shortfalls; investigation possible sources of additional financing; and finally allocating of available resources which are never sufficient to cover needs on a cost efficient basis.

L.1.3. For the 0105 project approximately US\$15,000,000 worth of heavy equipment will be acquired for the road rehabilitation program. Considering an average life of 8 years and a 8% interest rate, annual equipment ownership costs are estimated at about \$2,500,000, i.e. even if the equipment does nothing at all during the year, amortization and interest charges of this amount will be incurred. The current annual budget for Roads Bureau operations in Shaba are estimated to be around \$800,000. This, however, may not be a fair comparison because equipment purchases are carried on capital budgets and not included in annual operational budgets. However, the difficulty of sustaining heavy equipment purchases with funding limited basically to a road tax which cannot even currently sustain fuel payments and pay employees alone amortize heavy equipment drops in foreign currency is clearly demonstrated.

L.1.4. Information on equipment and operating costs as obtained from the Road Bureau in Lubumbashi is attached. Review of this data will indicate that fuel and lubricants for heavy equipment currently about 50% of annual

depreciation costs. A rough estimate of fuel and lubricants costs for the \$15,000,000 equipment drop would be $(\$15,000,000/8) \times (0.50)$ or \$938,500 per year which exceeds the current total budget for the Shaba Roads Bureau of \$800,000. The futility of attempting to sustain large mechanized road maintenance and rehabilitation programs at current resource levels available for this purpose is clearly demonstrated.

L.2. Conclusions

L.2.1. Road maintenance programs depending on heavy equipment cannot be sustained at current resource levels nor is there much chance that additional revenues can be developed in the short run which would permit such an operation to be self-sustaining.

L.2.2. If efficient utilization of resources is to be made, road maintenance procedures in Zaire should be made on a labor-intensive basis where such procedures are applicable.

L.2.3. Given current budgetary constraints, it will not be possible to carry out a full maintenance program on all existing and planned future roads. Prioritization will be required.

L.2.4. Studies are currently underway to determine possible additional sources of road maintenance financing; however, taking into consideration the current tax base in Zaire, it is doubtful that significant sources of additional funding will be found.

L.2.5. The current program which purports to implement a self-sustaining maintenance program and at the same time provides heavy drops of equipment for road rehabilitation to be done by the same agency is not consistent. Given the reluctance to adopt labor-based techniques in Zaire, AID policies should be to discourage not promote the utilization of heavy equipment by agencies which are responsible for road maintenance and cannot afford the luxury of paying for capital-intensive procedures.

L.3. Recommendations

L.3.1. The Roads Bureau should be limited to performance of road maintenance and minor road improvements. Some countries by law, Bolivia for example, preclude the Roads Department from undertaking large-scale road improvement and rehabilitation programs.

L.3.2. Labor and capital-intensive procedures cannot be mixed in the same organization. Separate implementation agencies are required. The roads network in Zaire should therefore be separated into networks which can be maintained manually and those which require heavy equipment maintenance. Separate organization structures should be developed for each.

L.3.3. Equipment-based road maintenance procedures are applicable to the project roads and should be implemented by a decentralized organization other than the Roads Bureau if this is possible within the time and political constraints of the project. This could be regional development authorities or special organizations such as SNRDA which are already working in the area.

EQUIPMENT OPERATING + OWNERSHIP COSTS SUMMARY

RECAPITULATIF

Coût d'exploitation du matériel
Office des Routes
June 1988

Item	Bulldozer	Loader	Grader	Roller	Flat Bed	Dump Truck	Pick Up
Purchase Price without tax	19.140.000	15.345.000	16.830.000	11.550.000	8.085.000	9.892.500	1.980.000
Depreciation Period	8 ans/6,000H	8 ans/6,000H	8 ans/6,000H	8 ans/4,000H	4 ans/12,000Km	4 ans/12,000Km	4 ans/12,000Km
Amort. Cost	3.190	2.557,5	2.805	2.887,5	67,37	83,19	16,5
Insurance	87,19	62,8	94,70	766	2,85	2,3	0,97
Labor	741,49	741,46	741,46	741,46	16	16	7,9
Fuel	1.470	1.050	1.575	840	25	35	10,5
Lubricants	262,5	187,5	281,25	150	2,63	3,75	1,13
Spare Parts	2.552	2.046	2.244	2.310	53,9	66,55	13,2
	9.383	7.509	8.748	8.695	190	230	57

SOURCE: ROADS BUREAU, LUBUMBASHI

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M. ISSUE: ASSESSMENT OF GEOGRAPHICAL VARIATION IN THE RISK OF ROADS NOT BEING MAINTAINED AFTER COMPLETION OF THE PROJECT

M.1. Findings

M.1.1 The field trip along the link road indicated little variation which would significantly increase road maintenance costs on a geographical basis. Adequate surfacing materials in the form of laterite, sands and gravels, lateritic gravels and sand-clay mixtures were available within reasonable haul distance throughout the area.

M.1.2. Topographical conditions varied from flat to rolling. Very few sections of mountainous terrain with grades exceeding 6% were observed. On flat areas, the rehabilitated road is required to be elevated above the existing ground surface to facilitate drainage and preclude excessive maintenance costs.

M.1.3. A slight variations in village density increasing from north to south appeared to occur and savannah areas seemed to be less populated than forested sections will have to be taken into account in designing labor intensive maintenance programs. Also, the population density along feeder roads was reported to be much less than along the link road which would require special consideration.

M.2. Conclusions

M.2.1. Other than differences in population density, there appeared to be no major variation in condition over the project area which would increase or diminish the risk of roads not being maintained.

M.2.2. Experience in other countries has indicated that roads are most likely to be maintained by local communal groups when these groups are included in the decision making process and participate in the construction. Where such procedures have been successfully implemented, the probabilities of the road being maintained are increased as compared to a situation when such practices are dictated by a centralized organization.

M.3. Recommendations

M.3.1. The risk factor on road maintenance can be reduced by actively involving the community in the road maintenance program. The maintenance organization proposed for this purpose should reach these grass root levels and is independent of any minor geographical variations in the project area.

N. ISSUE: ASSESSMENT OF PRIVATE SECTOR ENTITIES TO COMPLETE PORTIONS OF THE ROAD REHABILITATION PROGRAM

N.1. Findings

N.1.1. This problem is currently being addressed by a questionnaire prepared by USAID circulated in the project area to determine potential interest of local contractors to perform road rehabilitation and maintenance functions.

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N.1.2. Louis Berger International, Inc. in Lubumbashi indicates that they would normally expect 4 to 5 local contractors in Lubumbashi and Kinshasa to bid on the 160 kms of Section III road rehabilitation program. Construction contractors are currently being prequalified for this project on an international basis.

N.2. This issue can better be addressed when results of the survey are available. However, it would appear that large locally based contracting firms are sufficient in number to result in a competitive market for projects say above \$1,000,000. The availability of smaller and intermediate sized contractors has yet to be determined.

N.3. Recommendations

N.3.1. Recommendations for incorporation of local contractors into the rehabilitation program can only be made after survey results are available.

N.3.2. If not already available, an attempt should be made to stimulate the formation of small and intermediate sized contractors in the project area. Much of the work can be done by labor intensive methods not requiring investment in heavy equipment.

N.3.3. Interested contractors should be prequalified on the basis of capacity. Their capacity should be carefully checked to preclude misrepresentation, e.g. equipment that is obsolete or not in working condition.

N.3.4. Various contract methods should be studied to determine applicability. In some areas prices for road rehabilitation are fixed and interested prequalified contractors selected by a lottery method. If the contractor completes the project satisfactorily, he is assured another contract. In other areas, equipment is rented from a contractor along with the operator. The contractor is responsible for the units maintenance and operation. Work programs, however, are established by the engineer-in-charge. The contractor is paid either on a daily, hourly or production basis.

O. ISSUE: ASSESSMENT OF ROADWORK TIMING

O.1. Findings

O.1.1. The one year delay in the road construction program is already impacting negatively on the agricultural component to the point that unless some emergency repair program is initiated there is some doubt as to whether the 1989 surplus can actually be transported to railheads as programmed.

O.1.2. If emergency road repairs are made as recommended to permit transport to railheads, then the problem of storage exists. The railroad capacity has been estimated at 25,000 tons per month under normal conditions. Adequate storage capacity of the anticipated 1989 agricultural surplus must be provided compatible with this capacity.

0.2. Conclusions

0.2.1. The problem of timing between the road and agricultural component can be largely resolved if two conditions are met:

- An emergency road repair program be initiated with the purpose of reconstructing all sections of feeder and link road which are currently impassable to truck traffic. This will at least permit the projected surpluses to be transported to railhead at somewhat higher freight charges.
- Sufficient storage space is made available so that the railroad can transport the surplus to markets without exceeding their current rated capacity of 25,000 tons per month.

0.2.2. Once the emergency road repair and storage construction program is completed, the road construction program should proceed based on the general guidelines indicated in the attached Memo dated 4 November 1988 from Mr. Spake.

0.3. Recommendations

0.3.1. The above implementation program be used as a guideline for developing road construction programs.

P. ISSUE: COMMENTS ON PROBLEMS WITH CONTINUED ROAD MAINTENANCE OF NORTH SHABA ROADS

P.1. Findings

P.1.1. Field trip inspections programmed between November 7-11 did not include roads on the North Shaba project. Comments on personal observations cannot therefore be made.

P.1.2. The PNS road, however, were visited between Oct 19-29 by an AID project team and an evaluation made the results of which are included in the attached Memo of November 4, 1988.

P.2. Conclusions

P.2.1. The report indicates that the road maintenance program whereby contract labor intensive maintenance is done by a private sector firm is not effective.

P.2.2. The lack of maintenance on PNS roads has negative impacts on the agricultural sector and raises doubts among local planters as to the viability of the entire PNS project. Reports are that villagers may not increase corn production as intended if surpluses cannot be transported over the existing road network.

P.2.3. Results are even more disappointing because funding from PCS projects has been diverted to finance road maintenance of PNS as local funding for fuels and payment of workers are not available.

P.2.4. The report confirms the need for adequate logistic support, prompt payment of salaries to workers, adequate hand tools, training and good control and monitoring are essential if labor intensive methods are successful.

P.2.5. The report indicated that the current contract is not qualified to perform the work required because of lack of experience of road maintenance projects. There is some doubt, therefore, local experienced road maintenance contractors are available in the project area.

P.2.6. Apparently parts of the network have deteriorated to the point that some sort of mechanized rehabilitation is required if roads are to remain open to traffic.

P.2.7. Workers apparently have not been paid for three months on the project. This is an intolerable situation as prompt and regular payment of workers must be made to provide incentives for the work to be done.

P.3. Recommendations

P.3.1. The possibility should be considered of including PNS roads in the network to be repaired as part of the emergency program recommended for PCS roads in order to permit 1989 harvest to be transported to railheads.

P.3.2. The reason for which SOZADEV workers are not being paid should be investigated and the situation corrected.

P.3.3. The availability of experienced labor/contractors perform maintenance work in the area should be more carefully investigated. If there is an absence or shortage of such firms, then this must be taken into account in project by either providing the needed inputs temporarily until experienced is developed or use other methods to administer the program.

P.3.4. Payment to contractors for maintenance should be made only after the work performed is inspected and approved as satisfactory.

P.3.5. Administrative controls and monitoring of maintenance work should be tightened.

Q. ISSUE: ASSESSMENT OF ORGANIZATION AND MANAGEMENT OF THE ROAD COMPONENT OF THE PROJECT

Q.1. Findings

Q.1.1. The Roads Bureau is a dependency of the Ministry of Public Works and is responsible for maintenance of the primary road network and the classified feeder road network at the national level. The unclassified feeder road network is responsibility of the Ministry of Agriculture. The Roads Bureau operates at the national level with district offices which correspond to regional political boundaries. The districts are further divided into subdistricts called production units which are distributed

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throughout the District. The PCS project is geographically located in two of these five districts and there is some question as to whether the project could be managed more efficiently through the Lubumbashi regional office rather than through two district offices. This problem is currently under consideration by the Lubumbashi office. The Roads Bureau in Lubumbashi had administrative offices, central equipment repair shops and warehouses and a technical training school. The Bureau is dependent financially almost exclusively on GOZ allocations as collected through a fuel tax.

Q.1.2. The road network in the Shaba province consists of about 145,000 kms of road of which 2,800 are paved, 65,000 unpaved classified roads which are supposed to receive regular planned maintenance and the remaining secondary unpaved feeder roads which receive only occasional sporadic maintenance.

Q.1.3. The Shaba Roads Bureau was considered in the Project Paper to be capable of implementing the 0105 Project; however, recent financial precluded the Roads Bureau from meeting their financial obligations with the result the payments for fuels and salaries have not been met promptly. Progress on the road maintenance and rehabilitation program has diminished considerably and at the time the roads were visited between Nov. 7-1, 1988, ceased completely.

Q.1.4. The Shaba Roads Bureau has a permanent staff of around 750 employees and a annual operation allocation of around \$600,000 equivalent. The Project alone has 180 employees at an annual cost of \$210,000 equivalent including salaries, bonuses and medical benefits. At the time of the 0105 agreement, annual revenues received by the Shaba district were on the order of US\$10,000,000 equivalent. This is now \$600,000 (see Memo attached).

Q.1.5. The Shaba district is currently in debt to the amount of 2140,000,000 (US\$608,000 at 2230/US\$). Even under the best of conditions assuming the fuel tax situation were resolved by Jan. 1989, at least one year would be required to amortize this debt and meet operating expenses. There has been some criticism that although field work in the District has diminished the number of employees has remained the same. One of the problems of the Roads Bureau is that employees once contracted can only be released because of proven incompetence or gross neglect of their functions. As road personnel do not normally leave their positions due to lack of opportunities in the private sector, long term natural attrition is the only way the currently top heavy administrative burden could be reduced.

Q.1.6. Lack of funds for salaries, medical benefits and operational costs has demotivated Roads Bureau employees. Furthermore, lack of funding has precluded hiring of the additional equipment operators and mechanics required to maintain and operate the new equipment to be acquired under the project. USAID has not been willing to pay fuel and salary costs amounting to 2210,000,000 (US\$500,000) for 1988 operational costs out of counterpart funding to keep the project going. The payment of fuels and personnel is a Bureau of Roads contract responsibility. AID until now has not been willing to waive and assume this cost directly even on an interim basis until the fuel tax situation is resolved.

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Q.2. Conclusions

Q.2.1. The current financial situation of the Roads Bureau in Shaba is critical and cannot be differed. The heavy sunk investment in the Project and additional capital investments in new equipment already being implemented preclude project abandonment particularly as the agricultural component is considered to be highly feasible. An immediate solution to the financial problem must be found. The alternatives available are:

- a) Increase fuel taxes immediately to meet current operational deficits.
- b) Transfer available insufficient resources from other Bureau of Roads Districts to meet project expenses
- c) Use AID counterpart fundings to meet current Roads Bureau project deficits as an interim or permanent measure until a solution is found to the local financing problem.

Q.2.2 The Shaba Roads Bureau is the only organization which has the potential resources to implement the project. This resources must be used. How they are used is open to discussion. The alternatives available are:

- d) Maintain the status quo without change.
- e) Try to make certain structural changes within the Shaba Roads Bureau which would expedite project termination
- f) Use Roads Bureau resources but channel these resources through an expanded AID Project Office in Lubumbashi which would borrow Roads Office personnel & facilities as required to implement the project. AID under this alternative would assume Bureau of Roads local expense obligations as indicated in item "c".

Q.3. Recommendation

Q.3.1 The solution which perhaps is most effective in the short term is to combine item "c" and "f" whereby AID would immediately pay for local salaries and fuels but manage Roads Bureau resources directly through an expanded project office in Lubumbashi. The details of how this would be done has to be worked out. This could be considered only as a interim measure until the project is moving satisfactorily at which time control could be shifted back to the Roads Bureau.

Q.3.2. The fall back position in the event the placing AID in direct control of the project is unacceptable to the GOZ would be to combine item "c" and item "e" at least until such a time that the fuel tax alternative in item "a" is implemented. The structural changes to be implemented would be those recommended as part of this evaluation.

Q.3.3. Further distortion of Bureau or Road bugetary allocations to meet local project costs as indicated in item "b" is not considered to be an acceptable alternative. The Roads Bureau already has had to shift their own resources from other areas to meet project commitments.

R. ISSUE: EVALUATION OF INSTITUTIONAL LINKS

R.1. Findings

R.1.1. Due to excessive workloads resulting from the 0105 Project, a separate agency SNRDA under the Ministry of Rural Development has been create to administer rural road maintenance projects at the national level utilizing contract maintenance procedures to the private sector. The SNRDA has no resources in the form of equipment and Bureau of Roads personnel are still required for technical inputs. SNRDA has been assigned a secondary network within the 0105 project which will be maintained through these contract procedures. Citoyen Tusnbu-Tsunbu, the Shaba regional representative for SNRDA when interviewed in Lubumbashi on November 16, 1988 indicated that problem were being encountered in implementing the program but he was confident that the organization could be made functional. The World bank is providing funding for the organization. Costs are reported to be around 225,000 per km or about \$110 at the current 2230/US\$ rate.

R.1.2. The Peace Corps is expected to provide services to the project

R.1.3. PVO and other NGO organizations as well as the missionary groups are working in the area and could participate on the labor intensive road maintenance program.

R.2. Conclusions

R.2.1. Other institutions including the SNRDA, PVOs, Peace Corps and Mission Groups could be effectively incorporated into the proposed rural road maintenance program.

R.3. Recommendation

R.3.1. A rural road labor intensive maintenance plan must be complete for the project area which will define the participation and integration of the various entities available into the maintenance process. The plan should be designed and implemented as soon as possible.

S. ISSUE: ASSESSMENT OF TECHNICAL ASSISTANCE

S.1. Findings

S.1.1. Technical Assistance in the project is expensive with a budgeted amount of \$14,285,000 or 42% of the total \$33,907,000 USAID contribution to the project.

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S.2.2. When asked to comment on the benefits of this technical assistance, the Roads Director in Lubumbashi indicated that although some of this assistance was undoubtedly necessary, not all of the program was cost effective in the roads sector and should be reevaluated in view of the considerable cost involved and streamlined. Specific recommendations as to desirable and not essential technical assistance were not given.

S.1.3. The Roads Director indicated that in some cases the USAID was forcing criteria upon the Roads Department. The Roads Department was not in a position to object considering AID's essential role as the financing agency.

S.2. Conclusions

S.2.1. The need for technical assistance on rural road projects is often overstated and the capacity of local personnel undervalued. Rural roads are not high tech. In many cases farmers are more capable of maintaining their roads than engineers.

S.2.2. In many cases what is called technical assistance are really administrative and control measures including the need to minimize deviation of funds to non-project purposes by placing an expatriate in charge of a section.

S.2.3. Technical Assistance in some cases can have negative impacts in cases where expatriates' instead of assisting counterparts actually perform the counterparts task. This detracts from the long term capabilities of the roads organization.

S.3. Recommendations

S.3.1. The technical assistance aspect of the program should be reviewed jointly by AID and the Roads Bureau and mutual agreement reached as to how the program can be made more effective, less costly and more responsive to the needs of the Roads Bureau. Roads Bureau participation is considered essential. Changes should not be made unilaterally by AID and imposed on the project unless there are very convincing reasons for doing so.

T. ISSUE: ASSESSMENT OF USAID OVERSIGHT

T.1. Findings

T.1.1. One of the problems involved in this and other AID projects is the "fast track" approach used by AID where the project goes directly from the Project Paper to implementation without an intermediate design stage. If designs are required they are done during the implementation period when problems have been encountered. Although this procedure can work on some projects, in most it requires reevaluation and redesign often to the extent that the original project has little resemblance to the final product. This can be a costly, time consuming process. Example: the Project Paper recommends a labor intensive road maintenance system be implemented on the project. Two years have gone by and no system has yet been designed although

several have been tried without much success. The major problem to date is that roads are being built but not maintained - example PNS roads. Should the project have been phased so as to have the labor intensive maintenance program was designed and working prior to initiating an extensive 2,000 km road rehabilitation program?

T.1.2. The AID Shaba Development Office in Lubumbashi is not a 0105 Project support office although it currently provides many of these functions. The original purpose of the office was to provide office space and logistical support to AID personnel working in the district.

T.1.3. A problem reportedly exists of overlapping authority between the OR-AID Coordinator in Kinshasa and the Project Director in Lubumbashi whereby conflicting instructions and policies are sometimes dictated to project personnel.

T.1.4. The office in Lubumbashi appeared to be well organized and functional.

T.1.5. The support given to the evaluation team in both Lubumbashi and Kinshasa was excellent.

T.2. Conclusions

T.2.1. In the event the decision is to be made to implement the 0105 Project through AID, then the Lubumbashi office should be expanded to include a Project Implementation Team.

T.2.2. The general oversight system appears to be working well and unless major changes occur in implementation of programs, no changes are required.

T.3. Recommendations

T.3.1. The apparent conflict in the chain of command indicated between the Project Director and Project Coordinator should be resolved.

U. ISSUE: EVALUATION OF MANAGEMENT SYSTEMS

U.1. Findings

U.1.1. Time available did not permit an extensive evaluation of in-place management systems required for implementation of the road component.

U.1.2. The basis for any rational road maintenance program is the road inventory which defines maintenance workloads as a function of road length, type, width, condition, structures. This inventory apparently has been completed by AID for project roads.

U.1.3. Management systems for equipment in the Kongolo district were not operational.

U.1.4. Management systems for equipment in the Roads Bureau shops in Lubumbashi appeared to be in-place; however, effective application could not be verified.

U.1.5. No evidence of implementation of a Rural Road Maintenance Management System including crew composition, production rates, recommended maintenance procedures, and costs was observed. In any event it could not have been implemented without a road inventory.

U.1.6. The network apparently had not be broken up into control sections for costing and accounting purposes.

U.2. Conclusions

U.2.1. There appear to be deficiencies in existing management systems and procedures; however, a more detailed analysis is required to define deficiencies.

U.3. Recommendations

U.3.1. A more detailed analysis be made of management systems in place to determine if adequate. It must be emphasized that these systems must be practical and required adequate reporting procedures from the field. A common complaint is that management procedures are too complicated and sophisticated for effective implementation.

U.3.2. One aspect of the management system which deserves immediate attention is the write off procedures on roads which have been rehabilitated under the program and are to be maintained by the Roads Bureau or SNRDA. Currently no formal transfer of responsibility and confusion arises when a rehabilitated road deteriorates for lack of maintenance as to who is responsible for the additional work to be performed. A system should be introduced whereby a joint inspection of a completed road is made and the entity responsible for maintenance formally assumes this obligation.

V. ISSUE: ACTUALIZATION OF PROJECT COSTS

V.1. Findings

V.1.1. Estimated Project Costs as Indicated in the Project Paper are indicated below for the first phase:

a) AID	\$33,907,000
b) Peace Corps	\$ 800,000
c) GOZ	\$24,413,000
d) Total	\$59,120,000

It should be that the GOZ component comprises local funding to be provided by the Roads Bureau to the Project through fuel tax contributions and also USAID counterpart funding from the PL-480 as well as agricultural inputs.

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V.1.2 The AID contribution to the Project first phase is:

e) Technical Assistance	\$14,285,000
f) Participants (Training)	\$ 400,000
g) Commodities	\$14,241,000
h) Other	\$ 4,981,000
i) Total	<u>\$33,907,000</u>

These costs again include both agricultural and road components.

V.1.3. Road component costs would tend to increase for the following reasons:

- Extended road rehabilitation time frame due to the fact that the project is already one year behind time and that construction periods appear to have been underestimated in the project paper.
- The extended rehabilitation program will require increased and extended technical assistance increasing item "e".
- The original Project Paper estimated assumed that all link and feeder road rehabilitation would be done by force account and did not take into account the private sector award of 160 kms as currently contemplated. The higher private sector costs would have to be included as an additional line item in item "g".
- Increased equipment availability due to the Japanese \$7,000,000 drop eas not contemplated in the original Project Paper. This could increase fuel costs in item "c" which probably would have to be paid by AID counterpart finding rather than local GOZ fuel taxes.

V.1.4. Road component costs would tend to decrease because:

- The additional Japanese equipment drop would expedite construction.
- Recent changes in link road geometric criteria including decreases in of right-of-way and width of traveled way between the ditch lines would tend to facilitate construction.

V.1.5. Road component costs are indeterminate to the extent that:

- The number of link road kilometers to be rehabilitated still has not been defined with respect to the secondary feeder road network.
- The ability of the GOZ to fund fuel and direct salary costs as required by contract is a moot question. Part or all of this charge may have to be absorbed as a counterpart payment which would affect the fuel tax/PL-480 ratio of item "c".

- The distribution and number of equipment units which will be made available to the project as well as their availability date has not been determined so that the number and composition of crews can be determined and schedules made.
- The emergency road repair program intended to rehabilitate the entire link and feeder road network to permit evacuation of the 1989 harvest has not been costed.

V.2. Conclusions

V.2.1. It is not possible at this time to make approximate ball park estimates actualized cost estimates. Calculations on the attached sheet would indicate a shortfall of about \$5,000,000 for the road comment only.

V.3. Recommendation

V.3.1. Actualization of project costs must be defined more accurately by a detailed analysis which takes into account the factors indicated above. If this cannot be done internally, then a consultant should be hired for this purpose.

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Road Component
Use 7 - Year Analysis Period

A. Schedule Assumptions

- 1) Analysis Period starts June 1986 and ends June 1993
- 2) Road Rehabilitation Program will require four more years to complete and include the additional 500-800 kms of secondary feeder road.
- 3) Road Rehabilitation Program ends (Jan. 1989 plus 4 - years) in Jan. 1993.
- 4) Road will be maintained by available equipment through Jan, 1993 and then turned over to the Road Bureau who will maintain the roads by labor intensive methods for 6 months until the end of the analysis period of June 1993.

B. Technical Assistance

Additional funding required:

Extension of Morrison contract (1 yr)	\$250,000
Project Manager for Roads	\$313,000
Additional Cost	<u>\$563,000</u>

Additional Time Required

for Long Term Personnel Excl. Project Manager (1 yr x <u>\$4,775,000</u>)	\$955,000
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Total Additional TA Cost	\$1,518,000
	approx <u>\$1,500,000</u>

C. Additional cost of link road contract construction contract cost: 150 km
about 40,000 \$6,000,000
Assume this could be done at half the price by force account using project
equipment
Additional cost: \$6,000,000 x 0.5 \$3,000,000

D. Cost of Emergency Repair Program	
Approx 50 kms at about \$10,000 each	<u>\$500,000</u>

Total increased cost \$5,000,000

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Date: 4 November 1988

Reply to
Attn of: Bruce Spake, FPO 105AG

Subject: Priority of secondary (i.e. non-LINK) roads in the Central
Shaba Agriculture Development Project Roads Systems

To Don Brown, ARD
W. Anderson, PDO
R. Braden, USAID Engineer

Below please find a summary of 105ag's feeder road proposition, as presented on November 4 at the project coordinating committee meeting.

We request that 105R rehabilitate project secondary roads in the following order of priority.

1. First priority
 - A. Kakuyu - Kaxiba RR 628

This road serves Kitanda Railroad in Manono zone a few kilometers south of Kabalo zone. Kitanda Railhead will allow food crop traders from as far south as right bank Manono and as far north as Katea in Kongolo to ship by rail to urban centers. Without the repair of this road, traders in western Kabalo and Kongolo will have to ship from Kabalo Railhead or Kongolo Railhead, adding up to 100 kilometers to a trip to the railhead. Traders wishing to buy crops in southwestern Manono and in right bank Manono will not be able to do if they intend to sell their purchases in urban markets--as there would be no practicable means of shipment to these markets.

- B. Mwadi Katoloka - Kitengo RR 633

This road closed since 1963, will permit Kasalian traders easy access to western and central Kabongo zone and stimulate and increase in production of palm oil, beans, and corn in Left bank Lomami in Kabongo zone.

2. Second priority: The rest of the regional roads (RR) as listed in annex 6, page 5 of the project paper. The rehabilitation of these roads should follow the sequencing of Link road rehabilitation and should be planned by Offices des Routes, taking into consideration the location of its work sites and the cost of road repair in time and material.

3. Third priority: The rest of the roads (in blue and very light green on the September 1988 project map).

N.B. The third priority roads are the roads proposed for the project by 105AG and 105R. They were concomitantly proposed by the Shaba Regional Roads Commission for reclassification to the level of regional roads. This reclassification, if signed by President Mobutu, would automatically raise these roads to second priority, above.

In the event that SNRDA were to add the third priority roads to its system, propose that PDO and ARD decide whether these roads would become second priority. If SNRDA were judged capable of maintaining these after repair should be second priority.

Listing of Documents Consulted

The Economic Analysis of Rural Road Projects, World Bank Staff Working Paper No. 241, August 1976. General World Bank Guidelines for an operational approach to the economic analysis of rural roads.

International Road Federation, Road Seminar, held in Chicago, February 10-12, 1975. Multi-modal transport planning

Manual of the Planning of Labour-Intensive Road Construction, International Labour Office, Geneva, M. Allal and G.A. Edmonds, 1977. Guidelines for implementing labor intensive road construction procedures in development countries.

Economic Design of Low Traffic Roads, Organization of Economic Cooperation and Development, 1986 General guidelines utilized for design of low traffic roads.

Institutional Analysis of Rural Roads Maintenance Problems in Bangladesh, Associates in Rural Development, August, 1988. Evaluation of institutional problems associated with the implementation of road maintenance in Bangladesh.

Instrucutivo para la Construcción de los Caminos Rurales, Secretaria de Asentamientos Humanos y Obras Públicas, Mexico. General guidelines utilized in Mexico for construction and maintenance of rural roads.

Pavement Management Systems, Organization for Economic Cooperation and Development, 1987. Guidelines for establishment of pavement management systems.

La Inversión en el Transporte y el Desarrollo Económico, Gary From, 1965. General concepts concerning the design of transport projects within macro development strategies.

Construcción por Etapas, USAID, Transport Research Board, 1979. Guidelines for stage construction of rural roads in developing countries.

Manuel de Formation, Travaux Avec Main d'oeuvre Intensive, Gouvernement de la République d'Haiti, Département des Travaux Publics, July 1980. Training manual for application of labor intensive road maintenance and construction procedures.

Project Paper, Secondary Road Development, USAID, Haiti, Project No. 521-0149.

Project Paper, Highway Maintenance, AID-DLC/P-817, 1969, Costa Rica

Non-AID Project Personnel Interviewed:

November 4, 1988

Citoyen Nganzobo, Boomen, Ambua, Roads Bureau, Kinshasa

November 4, 1988

David Tighe, Mission Chief, Project Manager, Scott-Wilson-Kirtkpatrick, Kinshasa

November 8, 1988

G. Applemans, PSC in charge of Base Construction, Kime

November 14, 1988

Mr. Alan Graff, Section II Mechanic for Louis Berger Int. Inc.
Mr. John Shelp, Administrative Assistant for Louis Berger Int. Inc.

November 16, 1988

Tshitenda Kabundji, Director, Roads Bureau Technical School in Lubumbashi
Citoyen Bakolo, Director SGNPT, Lubumbashi
M. Beranger, Assisant Director SGNPT, Lubumbashi
Citoyen Nsitu Vuvu, Director, Roads Bureau, Lubumbashi
Citoyen Tsunbu Tsunbu, Regional Representative in Shaba for SNRDA
Anthony DiGennaro, Project Manager, Louis Berger International, Inc in Lubumbashi

November 18, 1988

M. Stroyman, Operations Director, SNCZ, Lubumbashi

Note. List does not include AID project personnel in Kinshasa and Field with whom the entire team had contract. I assume these names have already been included.

A. Lubina

Doc. No. 1019c
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