

PD-BAS 500

UNITED STATES GOVERNMENT

memorandum

DATE: April 23, 1984

REPLY TO
ATTN OF: PEO:SRSharp

SUBJECT: Burundi Basic Food Crops Project (695-0101) - Evaluation

TO: TWilliams, AFR/CA

OPTIONAL FORM NO. 10
DOCUMENT

Enclosed please find one copy of the BEC evaluation. We would really appreciate your assistance in having some copies duplicated for us and then distributing them to the following offices:

REDSO/ESA: John W. Koehring
Robert E. McColaugh
Robert D. Adams
Robert Anstrong

AID/W: TWilliams, AFR/PD/CCWAP
HHelman, AFR/PD/CCWAP
BBeyer, AFR/CA
DHynes, AFR/CA

Once we have completed the Executive Summary we will send AFR/DP/PPEA its copy.

Enc.

Basic Food Crops Project

(695-0101)

OFFICIAL PROJECT

OFFICIAL PROJECT
DOCUMENT

EVALUATION

April 10, 1984

John D. Blumgart - Evaluator/Team Leader
Robert D. Adams - Engineer/REDSO/ESA
Gregory B. Kruse - Ag. Economist
Robert E. McColaugh - Agronomist/REDSO/ESA

Table of Contents

Map of the Mugamba Region	-
Sketch of the Kajondi Farm	-
I. Summary of Major Findings	I - 1
II. Introduction	II - 1
A. Preface	II - 1
B. Project Background	II - 2
C. Findings and Results of Previous Evaluations	II - 5
III. Project Evaluation	III - 1
A. Engineering/Construction/Equipment Experience	III - 1
1. Assumptions	III - 1
2. Actual Experience	III - 2
3. Progress Achieved	III - 7
4. Conclusions	III - 8
B. Agricultural Dimensions of the Project	III - 10
1. Constraints or Problems Encountered during Implementation	III - 10
2. Progress Achieved to Date	III - 11
3. Conclusions as to Current Status, Appropriateness of Technologies Being Used and Future Prospects	III - 15
4. Recommendations	III - 28
C. Economic and Financial Analysis	III - 30
1. Introduction - Limitations of the Analysis	III - 30
2. Economic Analysis of the Project and the Recurrent Cost Issue	III - 31
3. Farm Financial Situation	III - 38
4. Recommendations	III - 45
D. Institutional Considerations	III - 58
IV. Recommendations	IV - 1
A. Introduction	IV - 1
B. Criteria for 1986 Review	IV - 4
C. Recommendations	IV - 10

ANNEXES

Annex A - Glossary of Terms
Annex B - Team Contacts in Burundi
Annex C - Project Budget Estimates, FY 1980-1986
Annex D - Bibliography
Annex E - Discussion of Kajondi Seed Crops
Annex F - Partial Budgets - Kajondi Farm
Annex G - Quality and Price Considerations
Annex H - Summary History of the BFC Project

REGIONS NATURELLES DU BURUNDI

MUGAMBA

RWANDA

ZAIRE

Tanganyika

TANZANIE

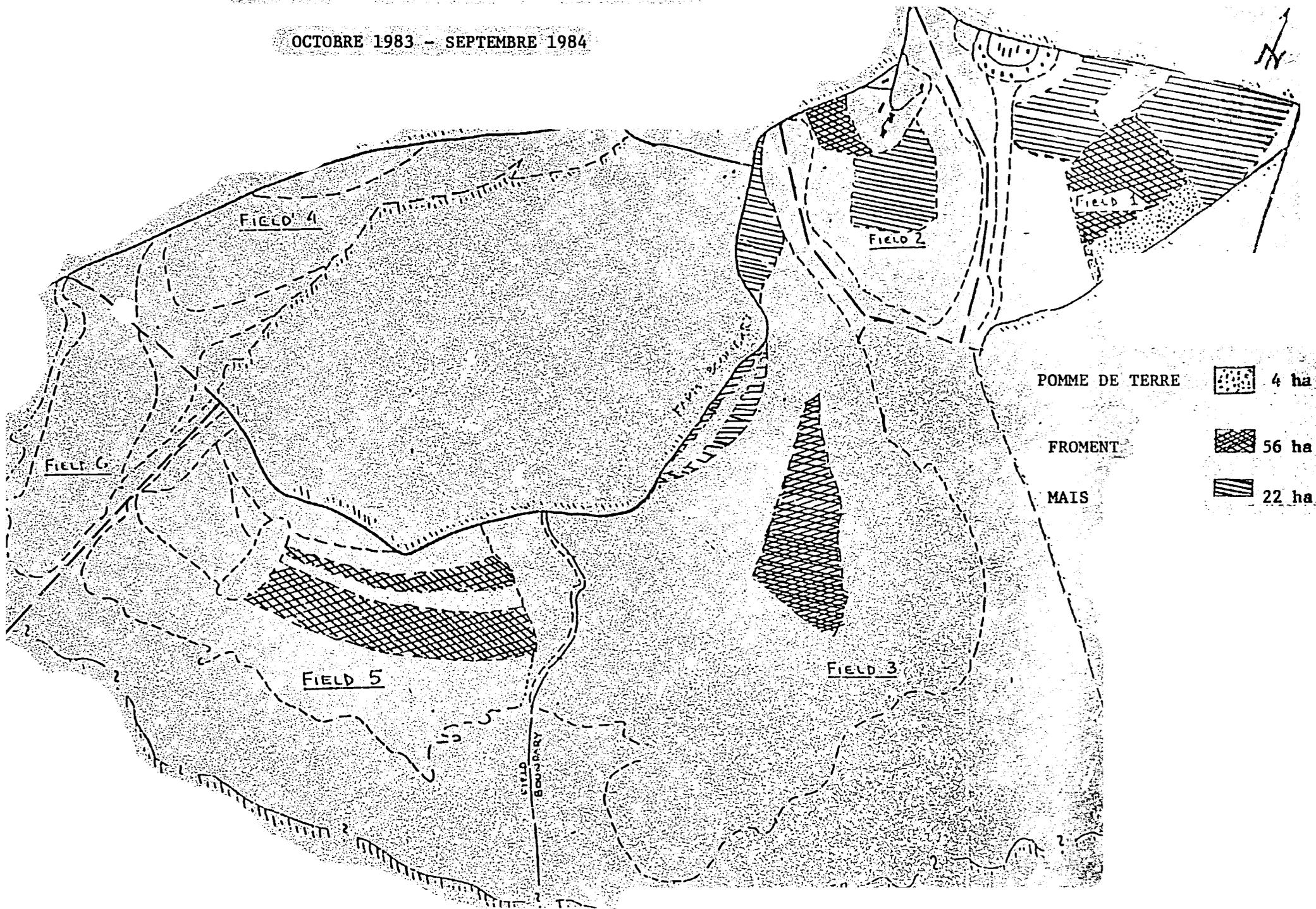
Echelle: 1/1.250.000

I S A B U

Département de
Socio-Economie Rurale

LA FERME KAJONDI : PLAN DE CULTURES SEMENCIERES

OCTOBRE 1983 - SEPTEMBRE 1984



I. SUMMARY OF FINDINGS

Although the BFC project officially was initiated in April 1980 with the signing of the Project Grant Agreement, in reality the first two years were largely devoted to preparatory activities -- the contracting for technical services, recruitment of staff, ordering of equipment, construction of staff housing and farm buildings -- although some seed crops were planted with rented equipment. Indeed it was not until nearly three years later, in early 1983, that construction was far enough along to permit the professional staff to takeup residence at Kajondi and even today one of the farm's most important functional structures -- the seed processing and storage building -- has not been started.

These delays in the provision of external resources -- many of which were attributable to conditions inherent in mounting a complex project 120 kms from the capital of a remote, landlocked country -- as well as subsequent problems in start up operations, have severely limited the track record of the farm's performance to date. Only a beginning has been made in producing the seeds for the crops the farm is to specialize in -- corn, wheat and potatoes. At the same time costs have risen much more steeply than anticipated and there is a serious danger of the project becoming a considerable budgetary burden to the GRB, as well as a foreign exchange burden, especially when AID financing ends. Another consideration is that the companion FED/CVHA project -- which was to serve as the outlet and dissemination agency for the farm's seeds -- was three years late in approval and only began to become functional in early 1983. Even today the FED-financed technical staff is just in the process of getting organized. Thus there is also a scanty track record on which to judge the capacity of the CVHA extension activity to provide extension, demonstration

* For a glossary of terms used in this report, see Annex A. o

1-2

and marketing services to the farmers of the Mugamba region and to create a market for the farm's products.

Another problem with the project is the serious inadequacy of the extent and organization of the records being maintained on the farm's operations. Despite earlier recommendations on installing a record management and accounting system, the farm's recorded data is in disarray. Data on field activities, on field operations costs, on maintenance practices and costs, on sales and delivery of seeds are incomplete and so disorganized as to make quantitative measurements extremely time consuming and difficult. There is also a lack of experience and data on the performance of the farm in its larger context, i.e. its benefit or potential benefit to small farm producers, although the basis for obtaining such data has been laid with the recent (1983) SOMEBU study.

A fourth factor involves the problems encountered in recruiting adequate technical and managerial staff at the farm (Burundi and U.S.) during 1982-1983 and their consequent effects, i.e. lack of a farm plan, failure to meet planting schedules and problems in managing farm operations. In addition, the competence and attitudes of the U.S. financed technical staff finally recruited to serve at Kajondi left something to be desired. Fortunately, things have improved on the Burundi side with the recent appointment of a promising farm director. But the need for capable U.S. personnel resident at Kajondi with the necessary language skills remains outstanding and at present the project is drifting.

A fifth factor relates to problems of AID oversight of the project. During lengthy periods over the course of the project, mission management and technical oversight have been inadequate. Staff turnover in AID/Burundi and difficulty in recruiting replacements have resulted in prolonged periods during which the

7

project was managed by non-agricultural personnel. The very real implementation difficulties of the project have led to a situation in which the Mission has been trying to cope with one crisis after another, diverting attention and energy from the tasks of planning and substantive involvement. These weaknesses have resulted in a serious lack of supervision of the performance of the contract staff at Kajondi. It is probably also a cause for the need for decided improvement in strengthening mission contacts and cooperation with the other "players" (Burundi and donor) in the seed research/multiplication/dissemination sector and in sharpening Mission perceptions as to the project's role in the larger picture.

Despite the many shortcomings of the Project Paper, it did conceptually identify an important way in which AID could assist Burundi's small farmers at the higher elevations. Improved seed is probably one of the few ways in which the Mugamba farmers can realize improved productivity through a technology they can afford. Increases in food crop production enjoys an extremely high priority in the government's 1983-1987 economic plan. AID, by agreeing to co-finance with the GRB the country's only mechanized seed farm, has aligned itself behind a high visibility project and raised Burundi expectations. The Ministries of Plan and Agriculture want to learn from the lessons of the BFC project in order to plan which directions seed multiplication should take in the future. CVHA and the FED are depending on the farm as an important source of improved seed for their outreach program. As the economic analysis makes clear, without the Kajondi farm the whole CVHA program will soon be in serious trouble. ISABU, on the other hand, sees the farm as one of its important "customers" for its research results and ISABU researchers have already started trials at the farm on improved varieties of corn, peas and potatoes. Clearly, there is a strong case for AID's continued participation in this interwoven, multi-donor undertaking.

1-4

As of April 1984, the project still has two and a half years to run, that is, through FY 1986. Existing funding should be adequate through FY 1985, but additional funding in the magnitude of \$0.5 - 1.0 million may be required for project activities in FY 1986 if technical assistance staff is brought on board promptly, the team's recommendations on technical assistance and research are followed and AID agrees to postpone for a year the GRB commitment to finance half of the project's remaining operating costs. Project disbursements should be followed closely so that the Mission can request additional funding next year if that is necessary to finance project activities in FY 1986. In the meantime, the team is reluctant to recommend a further extension of the PACD in the absence of an improvement in project implementation, a better system of farm management and financial record keeping, and a better indication that project outputs are beginning to make an appreciable contribution to Burundi agriculture in the Mugamba region.

The next two years will be important for the BFC project. They will allow for four more cropping seasons in which to resolve important agricultural and management problems at the farm. They will be years when the farm's outputs can be significantly increased and when quality control procedures can be introduced with the new seed processing plant and laboratory. They will be years when closer, more collaborative relationships can be cemented between the BFC project and its partner agencies. It will be a time when ISABU's research and field trials may raise the yield and reliability of seeds for the farm to multiply. During this time the FED-supported extension and demonstration activity should pick up steam, opening the possibility of reaching a significant percentage of the farmers of the Mugamba area. FED-financed small farmer field studies are scheduled for later this year and for late 1985 which should provide an indication

as to how well the High Altitude Food Crops program is performing. The BFC project should participate in these exercises -- with financing and/or personnel -- since their results will be so important.

As indicated earlier, AID's implementation record on this project has been unimpressive. If the project is to play its expected role over the next two years, major improvements will be required in Mission management, the procurement of technical assistance as well as better backstopping support by AID/W and REDSO/ESA. A different mode for obtaining technical assistance is required as the present contractor's performance in providing qualified personnel has been unimpressive and expensive. A PASA with USDA should be promptly explored as well as personal service contracts with French or Swahili speaking experts identified by REDSO/ESA and AID/W. The technical offices in AID/W (AFR and S-T) need to give special priority to finding the necessary contract talent (or to expediting the consumation of a PASA) and to providing direct hire replacements in advance of Mission staff turnover. But management and attitudinal improvements must start with those closest to the scene.

AID actions must be accompanied by improvements in Burundi performance as well. A series of steps to rigorously cut farm operating costs should be undertaken, including labor costs. A system of compensation by piecework needs to be established to increase labor productivity. The supervising personnel at the farm need to develop practices of managing by example and by leadership rather than issuing orders from a desk. A qualified Burundi Assistant Farm Director should be recruited to help the present new Director to carry out his responsibilities and to provide continuity when the former is away. Promising Burundi agriculturalists should be identified, nominated, and sent abroad for long term training to meet the farm's future personnel needs, and present staff members

given an opportunity for practical training at CGIAR centers and at African Management Institutes. Other important Burundi actions transcend the farm itself and will require "dialogue" between the interested donors and the GRB. One is to set an incentive price for wheat grain at the Muramvya mill which will stimulate local production. A second is to establish a national seed service which includes all of the scores of seed multiplication agencies in the country, so that the total effort has some coherence. A third is a firm cost-sharing agreement with the financing authorities for 1985 (50 percent) and 1986 (75 percent) in exchange for a one year postponement of the present GRB commitment to finance 50 percent of operating costs (in addition to labor costs).

As soon as current project difficulties have been surmounted, AID should take the initiative and call together a "roundtable" discussion with Burundi CVHA and farm representatives to seek agreement on a joint program of action and support. The program should address the above problems and lay out a plan for reaching the targets suggested in the team's criteria for the next evaluation (see Section IV below). A broader meeting will be necessary on the "dialogue" issue.

As is discussed at some length in economic sections of this report, there are many unknowns and uncertainties which could affect the project. There is no guaranty, even if AID and the GRB are able to perform in the manner recommended, that project success will follow. This is to be expected. Development is an untidy, difficult business, dependent on many external factors. However, without an improved and really vigorous effort on the part of AID and the GRB, the project is bound to fail.

A further evaluation of the BFC project should be scheduled for May/June 1986 to assess the progress of the project and to evaluate its role within the broader CVHA and Burundi food crops picture. Yardsticks for evaluating project progress are included in the series of criteria identified by the team in Section IV. By then SOMEBU should have the results of both the "impact" studies it is planning to do on the CVHA program in June/July 1984 and September 1985. (AID should participate in this work). It is recommended that most members of the evaluation team be AID employees with previous experience with the project.

If the results of the next evaluation are positive and further AID support in that sector is judged to be desirable, the Mission will need to request interim funding and a three-six month extension of the PACD to permit the design of a follow-on project and to accomplish its review by REDSO/ESA and AID/W. If the results are negative, the Mission will have the remainder of FY 1986 to bring its participation in the project to an orderly close.

II. INTRODUCTION

A. Preface

In early 1984 AID/Bujumbura initiated steps to arrange for an in depth evaluation of its Basic Food Crops project (695-0101). With the assistance of AFR/PD and REDSO/ESA, an evaluation team was assembled in March comprising John D. Blumgart, evaluation officer and team leader; Robert Adams, Engineer; Gregory Kruse, agricultural economist, and Robert E. McColaugh, agronomist. Blumgart and Kruse were recruited under personal service contracts with AID/Burundi while Adams and McColaugh were made available by REDSO/ESA.

The team, or members of it, were in country from March 14 through April 10 including five days (March 19-23) at the Kajondi seed multiplication farm, the site of the Basic Food Crops (BFC) project. Introductory meetings with the AID Representative and his staff and with representatives of other donor and technical agencies were held during the first week. At the farm the team inspected the site and its facilities and met with its Director and a number of his staff. Farm records and other documents were reviewed. In addition, meetings were arranged with the Director of CVHA* (of which the BFC project is a component), the adviser to the CVHA's southern zone, and with two expatriate ISABU researchers working on improved potato, corn and pea varieties.

Returning to Bujumbura, the team met with additional Burundi and expatriate informants including senior officials of the Ministries of Plan and Agriculture. In addition, March 29 was spent at Muramvya for further discussions with the CVHA Director, the head of its FED-financed technical assistance team, its marketing expert and the Director of the flour mill located there. During the course of its visit the team held three review

* See Annex I for a glossary of local terms used in this report.

meetings with the Mission's senior staff to discuss the status of its work and its findings.

The team wishes to express its thanks to the AID staff in Bujumbura, particularly its head, George Bliss; Program Officer, Mrs. Sally Sharp; Agricultural Officer Stanley Wills and Special Assistant Sampson Ntunguka. Special thanks go to Bill Grant for his support and help at Kajondi and in town and to Phil Christensen for his insights. We would also like to express our keen appreciation to Mrs. Joan Rollin, Maria Hadjichristofas, Valerie Kamwana and Francine Panfietti for their kindness throughout and for the way they pitched in during the final stages of report preparation.

B. Project Background

The Basic Food Crops project (695-0101) was approved by A.I.D. in early 1980 with funding (\$5,458,000 authorized by the U.S. and \$2,389,000 to be contributed by the GRB). The project grant agreement was signed on April 3, 1980. Additional funding was made available in August 1983 to new totals of \$5.915 million and \$3.431 million respectively, and the terminal date of the project (PACD) was extended to September 30, 1986. The Basic Food Crops Project (BFC) constituted AID's first major development initiative of its new bi-lateral program in Burundi.

The project is based on a project paper prepared for AID by Mississippi State University in 1979 whose work in turn drew heavily on a 1978 feasibility study prepared by a European/Burundi consulting firm, SOMEBU (Société Mixte d'Etudes de Burundi).

The BFC is a component of a larger, decade-long GRB effort, Programme des Cultures Villageoises en Haute Altitude (CVHA) or High Altitude Food Crops Production. The program, proposed by the Ministry of Agriculture in 1978, aims at raising the productivity and nutritional levels

of small farmers in the Mugamba zone of Burundi (see below). CVHA is conceptually composed of four components :

(a) Research by ISABU (Institut des Sciences Agricoles de Burundi), the Belgian assisted agricultural research institution of Burundi (which has a food crops center at Kisozi) to produce high quality foundation seeds;

(b) Multiplication by the seed farm (the BFC project) to reproduce seeds furnished by ISABU for distribution;

(c) Extension and dissemination of the seeds through a FED (European Development Fund) financed project which has previously been providing technical services to improve tea production by the farmers of the Mugamba area;

(d) Marketing to be facilitated by the establishment of a flour mill at Muramvya to meet a portion of the country's flour requirements and to provide a source of demand for sale by the farmers of their surplus wheat and maize.

The target zone of the BFC/CVHA project is the highland region of Burundi known as the Mugamba. This is a high altitude heavy rainfall region, where a large and growing population is obliged to farm steep slopes in order to feed itself. Some relevant statistics are :

Altitude	1900 to 2600 m	average	2000-2200m
Area	(of which 28% is cultivated)		1500km ²
Rainfall		annual average	1480mm
Temperature		annual average	20.1°C/68°F
Population		Total	270,880 (1979)
Persons per km ²	(average)		181
Persons per family	(average)		4.8
Population growth rate			2.65%/year
Average farm size			0.5 ha

The growing population is straining agricultural resources and resulting in declining per capita food production. The main parameters of change are :

- (1) Declining average farm size; an immediate consequence of growing population, limited land resources and limited opportunity for emigration.
- (2) Declining soil fertility; several factors are at work:
 - (i) Reduction or elimination of the fallow period, which once restored soil fertility and organic matter.
 - (ii) Declining livestock population due to population pressure on pasture lands - manure is a traditional input, and valuable restorative of both soil fertility and structure.
 - (iii) Increasing erosion -as steep slopes are farmed intensively with minimal soil management (manure, fallow).

Traditional farming practices are no longer possible. A new system must be developed and introduced if the people of the Mugamba are to continue to feed themselves. The region is presently a net food importer. Given the circumstances outlined above, the situation can only deteriorate unless effective changes are introduced.

Since acreage cannot be significantly increased, increasing yields per acre are needed to feed the growing population. Given the almost purely subsistence economy of the region (annual average family income is estimated at 25,000 Fbu to 30,000 Fbu per year or \$280 to \$335 per year). Average annual spending on agricultural production (land rent, hired labor, tools, manure, cattle, taxes) is 4,200 Fbu, of which 45 percent is for livestock. This leaves a farmer with about \$25-30 U.S. per year for purchase of inputs to improve productivity.

It must be noted that farmers are familiar with the use of manure (although there is apparently room for improvement in their methods to reduce nutrient loss) and seed, whereas mineral fertilizers and agricultural chemicals are practically unknown. Consequently, improved seed and cultural practices are the first steps in an education and improved inputs program. The CVHA strategy is to produce seeds and cultural practices and the Basic Food Crops project therefore provides an essential input for both this extension program and for the farmers of the region.

C. Findings and Results of Previous Evaluations

Two field assessments of the project have been carried out, both by REDSO/ESA. The first was an evaluation performed over a week's time in February/March 1982 by a three person team while the second, termed an "implementation review" was conducted in May, 1983 at AID/Burundi's request, by two of the three officers who had participated in the first visit.

The 1982 REDSO team essentially reviewed the status of project implementation and its impact on the accomplishment of project activities and program objectives. It noted actual or potential cost overruns and estimated that an additional \$280,000 and \$211,000 would be required from AID and the GRB, respectively, to complete the project within its original time frame. It noted good collaborative arrangements had been established with ISABU and that Burundi's financial contribution to the project had been greater than projected in the Grant Agreement.

It made a number of recommendations regarding the management and operation of the farm. I particularly stressed the preparation of an annual farm plan, the importance of adhering to timely planting and harvesting dates, and the need to conduct annual phosphate and acidity tests on the farm's fields. The team also suggested cooperative action with the GRB Department of Agronomy to initiate trials of the farm's seeds on farmer fields, the preparation of a set of recommendations to farmers on seed crop cultural techniques, and that a closer professional relationship be established with ISABU. It was further

recommended, as a means of assessing the value of the project to its intended beneficiaries, that field studies be carried out, utilizing University of Burundi staff and students, to determine the extent of the project's "spread effect".

The Burundi project director concurred with the findings and conclusions of the evaluation team whose work he found to be "methodical and objective".

The 1983 implementation review assessed the status of action on the previous team's recommendations and then proceeded to comment on future project activities. In regard to the former, the reviewers found that action had been initiated or was in progress on eight of the twelve recommendations.

The most important of these concerned the need for additional funding, increased emphasis on participant training, spare parts procurement, inspection of construction, the recruitment of an administrative officer and training of maintenance staff.

Lack of progress was noted on recommendations regarding the establishment of an annual farm plan, the testing of Kajondi seeds on farmers fields, the preparation of recommendations on food seed cultural techniques for use by farmers and field studies to measure the project's impact on its intended beneficiaries.

Looking to the future, the reviewers stressed (a) the importance of a jointly prepared farm plan agreed to with ISABU and CVHA, (b) the re-ordering of crop priorities to stress soil improvement crops (buckwheat and lupine) and a seed production program emphasizing wheat and maize (c) efforts to establish targets for the farm's seed outputs through coordination with CVHA and SSS on their seed dissemination requirements, (d) production of forage crops for the farm's herd (e) greater attention and effort to "planning, monitoring and executing timely planting and harvesting operations", (f) the

setting up of a "sound accounting system for analyzing and planning future management decisions" through a contract with a local accounting firm.

The team recommended that the next evaluation take place in mid-1984 at which time it anticipated that the farm's seeds would have been tested on farmer fields and farmer reaction ascertained.

The Burundi project director agreed with a number of points in the review, such as the need to improve the farm's management and planting/harvesting schedules. But he also argued for the inclusion of potatoes and peas in the farm's production of seed, given local demand. In fact, potatoes are being included in the farm's program, peas to a lesser extent for lack of improved varieties from ISABU.

At the present time, a number of recommendations made as a result of one or both of the above reviews are still pending. Among the most important of these, in the opinion of the evaluation team, are : (a) preparation of an annual farm plan which is related to the research/foundation seed outputs of ISABU and to the dissemination/technical assistance activities of CVHA and SSS, (b) the need for improved management of the farm including planting and harvesting operations, and the utilization and maintenance of equipment and buildings, (c) establishment of a coherent set of farm records and their maintenance through establishing a farm record keeping and accounting system, (d) studies to establish base line data on the status of intended farmer beneficiaries and on changes made possible by the farm's activities.

In sum, the impression one gets concerning the results of the reviews performed on the project to date is that they have been mixed. A number of findings and recommendations have been acted upon, such as the need for additional funding and increased emphasis on participant training, with positive results. However, progress on others has not taken place and are continuing to

create problems for the project. Of particular importance is the absence of progress in the four problem areas noted in the preceding paragraph.* These and other issues will be discussed in the present evaluation report.

* Base line studies have however been carried out in the Mugamba in 1983 by SOMEBU with FED financing.

III PROJECT EVALUATION

A. Engineering/Construction/Equipment Experience

1. Assumptions

The engineering analysis developed in the project paper indicated an undeveloped farm upon which any area away from rock outcrops and a marsh would be suitable for siting project buildings. Building requirements were projected to be a housing area for operating staff which would include eight three-bedroom houses and four dormitory units of four-bedrooms each; and a farm operations area which would include offices, a machinery workshop, a seed processing structure, and storage for fertilizer and for processed seed. Electrical and water supply systems would also be constructed.

Existing architectural and engineering drawings developed for another GRB project would be used for the housing units and for the storage buildings. The Ministry of Public Works would contract with a private A/E firm to design and supervise construction of the offices, dormitory, workshop, the water supply system, and the seed processing building. A short term consultant would be contracted to assist the A/E firm in the design of the seed processing facility, and a construction advisor would be employed by AID under a PSC for a period of four months to assist the GRB in organizing final plans and beginning construction.

It was projected that the GRB would contract for the services of the A/E firm and that the invitation to bid on performing construction would be published both in the United States and in Burundi. It was anticipated that a contract would be let by the GRB for all works within five months following signature of the project agreement, with construction to be completed twelve months following award of that construction contract. Cost of all works was estimated at U.S. \$883,600 of AID funding plus a GRB contribution of U.S. \$74,000 for consulting services in design and supervision. The building area

requirements were determined by the farm operations team and the GRB Ministry of Agriculture and Livestock. Cost estimates were derived from actual 1979 data on hand in the Ministry of Public Works and projected at an annual inflation rate of 20 percent plus 15 percent for contingency. 16 percent of the original \$5.5 million proposed AID input was scheduled for construction.

The project paper also proposed the purchase of project vehicles from Code 935 source/origin suppliers and proprietary procurement of farm equipment from the United States. All light repair and servicing of vehicles and farm equipment was scheduled to be performed in the project workshop with AID covering costs of maintenance during the life of project (six years). Second echelon heavier repair of vehicles and tractors would be performed by designated dealers in Bujumbura. Project personnel were to receive training in heavy equipment maintenance.

2. Actual Experience

Soon after the project agreement was negotiated, it became apparent that the GRB preferred to have new architectural plans drawn for the houses and was under financial constraints, which limited the scope of work that it was willing to assign to a private architectural firm. Consequently, the design of the housing was entrusted in January 1981 to a Swiss architect, Mr. Jean Lietchti, who had been seconded by his government to the Ministry of Public Works. In the same month, the Ministry of Public Works awarded a contract to the firm of Kananura Melvin (KM) to perform architectural and engineering design of the group of farm buildings, with the exception of the seed processing and storage facility. The Ministry made no provision for services of this firm during construction. This design firm is one of a group of firms organized in several countries in this region under the aegis of a national of

that country with principals and professional staff headquartered elsewhere. The firm of Kananura Melvin (KM) was selected from a group of four interested firms, largely on the basis of lowest quoted price. The seed processing facility was not included because the KM firm did not have the capacity to design the building nor did the GRB have funds to pursue those design services.

The GRB chose a site in the higher, hilly section of the farm on which to locate the housing and operational buildings. This site has required moderate terracing and erosion control works which were not included in the engineering design. Design drawings for the houses were delivered by Mr. Lietchti shortly before ending his assignment to the GRB and returning to Switzerland. There was then no design person available to the MPW with whom to discuss various design changes which ultimately had to be made in the field. The engineering and bidding documents for the farm operation buildings were subsequently received from Kananura Melvin. Both the Lietchti work and the KM work were combined into one invitation for bid (IFB). This IFB was reviewed and approved by the GRB, REDSO/ESA, and the AID Mission. The following several deficiencies in the IFB were noted, which, in the interest of time, were left to be developed through discussion and change orders with the successful contractor:

- no specifications and few details were furnished. The Ministry of Public Works advised that these were fully covered in the GRB Standard Cahier Général des Charges which covers all public construction in Burundi. This has not proven fully satisfactory.
- Inasmuch as the housing and operational areas had been designed separately, efforts would be necessary to correlate the water and electrical supply systems.

- Terracing, erosion control, and storm water drainage were not spelled out on the plans.

AID source/origin regulations then in effect severely limited the number of firms eligible to participate in the bidding. These regulations have since been amended to consider long term resident firms as being of host country source/origin. True Burundian firms are formed, breakup, and are re-established under new names, thus making it difficult to assess their qualification. The Ministry of Public Works adamantly refused to advertise the project in neighboring countries and finally three Burundi firms were marginally qualified to submit bids and bids were opened on August 20, 1981. The bids were higher than expected and the qualification of the firms had to be reassessed and AID funding restructured. An AID/CBD publication waiver was requested in May and authorized in October. In retrospect, that waiver and a source/origin waiver on construction firms should have been sought in the PP. These factors delayed award by the GRB until early November, 1981. Award was made to then to the lowest bidder, the firm of COMIBURUNDI. The work was provisionally accepted in April 1983.

Consonant with normal conduct of construction contracts, a number of change orders were issued during construction. Inasmuch as neither of the designing architects was available to the MPW supervising engineer, details of these change orders were difficult to establish and several more minor changes are desirable even now as the contractor has essentially finished his work.

These change orders have included the following:

- a. The design of house for the farm manager was deemed unacceptable and was changed. Work on the house was delayed about five months while new plans were being prepared.
- b. The 2,500 liter water tank was determined insufficient for storage of water to meet peak needs and emergencies so an additional 25,000

liter reinforced concrete water tank was built above the houses.

c. All hallways in the houses were enclosed with a claustro wall to make them more useable.

d. The proposed tin ceilings were replaced with asbestos ceilings which would be both warmer and more soundproof. The contractor encountered problems with asbestos buckling at night due to sharp changes in temperature in the steel structure used to support the asbestos.

e. Ventilating openings under the house eaves were closed in the interest of building warmth.

f. Fireplaces and chimneys were added to houses.

g. Burglar bars for all windows and wall openings. The project has recently experienced the theft of a sink which was taken out through a break-in of the roof.

The above changes accounted for part of the four month delay in completing the construction but the primary cause was the inability of the contractor to do proper finishing work on the houses and buildings and the lack of good supervision of workers. Many of the plumbing fixtures had to be redone several times because of poor work and door and window frames frequently had to be remade. The inadequacies of details in the IFB and the absences of the supervising engineer meant that some fixtures were poorly placed and had to be torn out and replaced. The design for the roads and driveways on the housing side of the construction were not elaborated with the slope of the hills taken into consideration. The result was a problem of creating adequate drainage for the water coming off the roads down the driveways and drainage away from the canals around the houses.

The quality of locally available bricks finally proved unacceptable and concrete block masonry was substituted on several houses. A number of exterior wall areas are proving particularly absorbent to rain

and seal coatings must be developed.

Due to poor phase load distribution by the contractor and inadequate specifications for the fuse boxes in the generator shed and garage, there was a problem of blown fuses, over-heated wires, and malfunction of generators. Since resizing the generator cable, balancing the load, and replacing the fuse boxes with larger ones there have been no problems.

There were also problems in the sizing of the generators which were procured for the project by the Mission. Full information on power requirements was not available at the time the order was placed for these generators and they are undersized. This will require careful scheduling of loads such as operation of the welding machine and of seed processing equipment.

The contractor was advised by the Ministry of Public Works of the schedule of works by priorities prior to signing of the contract. However, in practice, this schedule was disregarded.

By late 1981, sufficient funds had become available within the AID grant to cover the costs of A/E services to design the facilities for processing and storage of seed. Processing equipment was already on order based on a list of requirements drawn by AID Consultant Mr. John Wilson. AID entered into a contract with the firm "TRIAD" of Nairobi to design facilities to meet the production and storage requirements stated in the PP with operational characteristics as advised by Mr. Wilson. A group of two Burundi firms, and one Kenyan firm were prequalified to bid on these facilities. One bid was received in December 1983 and the amount substantially exceeded both the estimate and available funds. Upon subsequent analysis by a REDSO Agricultural Advisor, the production and storage requirements were substantially reduced to a prequalified group of five Burundi firms and one Kenyan firm. Four bids were received on 27 March 1984 and are presently under review. At REDSO request, a price quotation has been supplied by TRIAD for consultation during construction.

Farm machinery, equipment and vehicles received thus far are generally consonant with the goals of the project and can be adequately maintained along the lines planned in the PP. Agent support is available in Bujumbura for the vehicles. The Mission has wisely ordered a considerable stock of spare parts for farm machinery which are enroute and will need to establish a procurement channel for spares for future operation of the farm by the GRB after this AID project closes.

However, observations should be noted here on three pieces of equipment. The corn sheller procured for the seed processing facility is larger than required and a replacement is being sought which will lower the electrical power requirements for its operation. The fuses supplied with the two electrical generators are not available locally nor in Kenya and would have to be ordered from the U.K. unless a substitute protective device can be installed. The two belt threshers supplied are inadequate and cannot be used on this farm.

3. Progress Achieved

The site has been developed and the houses, dormitories, and operational facilities built and occupied with the exception of seed processing and storage facilities. Tools and spares are on hand for the repair of vehicles. Repair manuals and parts lists have been requested. Parts for farm machinery are on order. Training in equipment maintenance still needs to be arranged. An appreciable amount of remedial details remain to be done on the buildings and a moderate amount of work should be authorized on storm drainage. The maintenance period under the COMIBURUNDI contract will expire in April 1984. The Mission now has and will continue to have the prerogative of pursuing any remaining remedial work through farm forces or possibly the new contractor,

utilizing as much of the five percent retention monies as may be required.

Operating staff comments received during the site visit on this evaluation indicate concern for these additional works:

- drainage/erosion control, principally around houses;
- sealing exterior wall surfaces against absorption of rain.
There may be some deterioration of lower brick courses from this;
- external, covered storage and cooking areas for occupants of type A and B houses who may be expected to use traditional open wood fires. The nooks near the doorways of the dormitory rooms would seem to be satisfactory for such use by their occupants; and
- landscaping.

These items are of a nature such that they would be eligible for AID funding. However, a clear plan and cost should be established in each instance and the work should be subject to specific authorization. It has been indicated that some six tons of cement (\$12,000) has been used by farm forces to build retaining walls and paved patios around the principal houses. One of these houses is remarkably and commendably landscaped.

An engineer from TRIAD should be in the area on consultation at least once within the next three months and may be requested to address any of the above questions.

4. Conclusions

Lessons to be learned by Mission and REDSO regarding future work in Burundi:

1. Do not rely on GRB/MPW to perform with its own staff nor to pay for design and IFB documents. This is a very critical input to success of the project and it is a false economy to accept it as a GRB input.

2. The regulation which now allows AID Geographic Code 935 contractors established in country for more than three years to be eligible should have been revised in this manner years ago. The move by the GEB to now permit Kenya firms to bid should be encouraged. If the project is too small to attract U.S. firms, seek a waiver of publication in the PP.

3. Equipment procurement by a procurement agent in the U.S. should be more carefully checked by the Mission before approval for purchase and shipment.

4. IFB documents should include detailed specifications and designs should include details, especially electrical, water and plumbing, with a design engineer available to the project on call as and when required during construction.

5. Construction supervision should be made available and thorough. Recent moves by the Mission to employ an engineering inspector on its own staff should be carried to conclusion promptly.

6. Design for electrical supply should consider balanced loading; load factors, operation and maintenance costs, demand with and without expatriates, plus any and all feasible alternatives to diesel generators

7. While hardly a new factor, it is worth reminding to check storm drainage, erosion, and related levelling costs when a site is being considered.

8. Prepare a thorough architectural brief to serve as guidance to the architectural designer.

B. Agricultural Dimensions of the Project

1. Constraints or problems encountered during implementation

Physical plant and infrastructure construction at the Kajondi seed multiplication farm was perhaps the first major constraint faced in project implementation. Construction of buildings fell up to 30 months behind schedule and the delay in construction of staff housing and working facilities postponed by over two years the arrival and daily on-farm supervision of both the AID project manager and the GRB counterpart farm director. Major farm development was restrained by lack of daily on-site attention by project management. The seed multiplication results have been set back at least two cropping seasons and more than half of the farm's 300 useable hectares is yet to be developed.

Weaknesses in farm planning, fiscal controls, and operational procedures for the Kajondi seed farm further contributed to untimely planting dates, poor field operations, problems of farm labor management, excessive operational costs, and a lack of the high quality controls needed for producing "certified" extension seed.

Delays in technical decisions and commodity purchases have affected the number of hectares developed to date, soil quality, and the cost per unit of land to bring these fields into full production.

Early machinery, equipment and commodity purchases were seriously delayed due to a number of factors. This was later partially remedied with the recruitment of a logistics and administrative assistant.

The questionable quality of the long term technical assistance provided by a consulting firm under contract to AID, plus host country counterpart changes have contributed substantially to the present project status. The lack of a senior U.S. advisor at this time is somewhat offset by the appointment of a promising Burundi Farm Director.

Cooperation and collaboration with the other components of the High Altitude Food Crops program has not been at the required or expected levels. On the extension side, the inability of the CVHA/FED program to forecast its seed needs (due to delays in the initiation of the project) has left the farm in an uncertain position in terms of 1984 production goals. Alternative markets for the 1983 "improved" corn seed seems to have been for human consumption not for small farmer plantings in the CVHA extension zone or to geographic areas outside the project zone (such as 1,500 kg sold in Bururi for seed).

On the research, genetic side, transfer of food crops research results to CVHA by ISABU and their leadership in development of new or improved varieties for the seed farm, as well as their role of major supplier of all foundation material for multiplication, have been less than expected. The need for a proper maize variety for the CVHA areas has not yet been met. Dependence on ISABU foundation seed and new variety research is seen as a long term problem and one that cannot be as easily addressed as those that fall within the boundaries of the farm.

In addition, there are major needs to achieve improved communication and coordination as the CVHA program gets underway. This specific area is one that requires the constant and careful attention of AID/Burundi and the other donors. For AID/Burundi it involves leading and guiding any technical assistance team that is finally put in place at the seed farm. Although progress has been made during late 1983 and early 1984 in strengthening ties with the other organizations but much is yet to be accomplished.

2. Progress achieved to date

In a review of progress to date, some of the project outputs and goals listed in the project paper and projected for 1984 are used as a reference guide.

a. "Physical facilities developed for a 300 hectare seed farm at Kajondi".

(1) Staff housing, offices, mechanical and equipment repair shops, storage areas, roads, water, communication and electrical systems are constructed and in operation at this writing (see Section III-A). Yet to be constructed and equipped is the vital seed processing and storage facility. Since this is to be a quality seed production operation the completion of this sub-activity of the project is of the utmost importance.

(2) Farm machinery, equipment and vehicles have been purchased and are in use. Various tractors, seed processing equipment, spare parts, specialized farm machinery and supplies have been ordered and still await delivery. Harvesting and shelling equipment will be purchased in 1984.

b. "Seed farm operated by trained GRB personnel".

(1) The project has provided the following technical assistance to help develop and train GRB personnel assigned on a permanent basis to Kajondi farm.

- Senior advisor. This position was vacated in December 1983 and is open at present.
- Equipment/Farm Operations advisor. Two long term advisors have served so far. This position will be open in June of 1984. Although not contemplated in the project paper to run the life of the project, we strongly recommend that this advisor be continued for at least two more years.
- Short term advisors have been provided in :

Aluminum toxicity	Soil erosion
Seed processing	Civil engineering
Seed multiplier	

The calibre of technical assistance has been mixed. Some of the short term advisors have performed effectively and provided competent, useful services. The more difficult tasks of the long term advisors have not been performed nearly as well, for want of capability, temperament or both. Of importance has been a lack of on the job training by the long term advisors for their Burundi counterparts.

(2) Summary of GRB personnel trained to run the Kajondi farm :

In terms of formal training one Burundi candidate will finish his B.S. training at Mississippi State University in seed processing in 1985. He has been an honors student and his input at Kajondi is needed as soon as possible.

The Director of the CVHA project has made two trips to the U.S. to study seed processing and technology transfer methods.

He also visited the CIMMYT Mexico operations. These experiences were felt to be very positive and his leadership in the CVHA is a key element to project success.

The participant trained at IITA in Root Crops is no longer in the project. Two USDA short courses will be attended by Kajondi administrators this year.

On the job training needs to be greatly emphasized during the remainder of the project and training plans established.

The team recommends the use of CIMMYT, CIP, CIAT, and other centers to train GRB agronomists that are in charge of corn, wheat, potatoes, beans and pea seed production at Kajondi.

Additional long term training should be financed to meet the farm's factor requirements for trained personnel.

c. "Sufficient quantities of seed produced for extension activities in the CVHA area and these sales to cover seed farm operational cash costs".

d. "The GRB will be able to continue the effort in seed multiplication after the AID PACD".

Both of these questions are discussed at length in the financial and economic section of this evaluation. At this point it should be noted that seed production at the Kajondi farm lags far behind the original estimates. Present seed sales are far less than anticipated, due both to production problems at Kajondi and the slow start-up of the CVHA extension project.

Summary

Kajondi Seed multiplication farm and the USAID/Burundi's Basic Food Crops Project are making positive but very modest impacts in the High Altitude Food Crop Program. The farm is established and unprocessed grain has been produced and has been distributed in small quantities for seed to farmers. The GRB has to date contributed in excess of it's original counterpart commitment. Host country staff has had some on-site training and one Burundi staff member is in specialized training in U.S. Affiliated agencies in the CVHA network are aware of the progress and are using the services of the farm. The University of Burundi has expressed interest in using the farm facilities in 1984 for learning experiences. International and regional agricultural research agencies have started limited trials at Kajondi. The project has experienced major difficulties in implementation. As a result, project output totals have slipped far behind original estimates and only limited progress has been achieved toward project goals.

3. Conclusions as to current status, appropriateness of technologies being used and future prospects

a. Infrastructure

Staff housing, offices, warehouses, machinery repair and maintenance shops have been constructed, though much later than planned, and are in operation. Water, electric, road and communication systems were developed, are in place and serving the present farm needs.

The major construction item contemplated for 1984, is the seed processing and storage unit. Most of the needed equipment for this activity is at the farm or in the process of arriving. Considerable adaptation will be required on grain conveyors and transfer machinery, this is normal and to be expected. Specialized short term technical assistance will be required to install, adjust and make this system function as well as train CRB staff in its operation.

Depending on seed production levels, crop types and marketing opportunities for 1984 some thought should be given to what storage and treatment processes will be carried on this season. A "quality seed" multiplication process, as in the case of this project, must assure its clients that the product is clean, disease and insect free, of high genetic potential for increased yields, sold at a stated germination rate and treated for maximum pre and post planting protection. This must include adequate storage and packaging procedures at Kajondi, based upon seasonal sales, cropping cycles and potential seed clients. It is evident that this system is not in place or very well thought out for 1984 needs. Before more large quantities of seeds are produced or sold this phase of the seed production and treatment process will need short term technical assistance and specific storage and processing plans will have to be developed and put into action.

The Wilson report of June 1982 (see bibliography) contains many suggestions on these processes. Seed sold to CVHA/FED in 1983 was of poor quality, which could hamper extension and marketing efforts.

Further decisions need to be made now on infrastructure development for seed potato storage. The GRB/CIP PRAPAC proposal made to AID/Burundi in 1983 contains a section on investigation of potato storage. (See further discussions on potato research below).

Land development : the physical transition from pastures to crop land, the chemical treatment to bring the pH and aluminium toxicity levels within acceptable cropping limits, and the addition of organic material is only about half completed at this stage of project implementation. Only about 65 ha are fully developed and about 150 hectares still remain in old pasture. Although the project design was overly optimistic in terms of land development goals and the late construction of staff facilities set back the on-farm management supervision inputs, the poor quality of resident technical advisors has also been a factor in slowing land development.

b. Basic Food Crops Seed Production

The Basic Food Crops Project was to first concentrate on production of wheat and maize seed then move into peas, beans and potatoes. The present situation as related to the evaluation team by GRB personnel in charge of the CVHA project and the Kajondi farm is as follows (See Annex E for further discussion of crops with particular reference to economic and financial considerations) :

(1) Wheat seed : The local Romany variety is well accepted by the farmers, gives a 20-40 percent increase over the more common wheats grown in the CVHA zones and there now exists a growing market for Kajondi seed approaching the yearly amounts as expressed in the project paper. Although Romany is not

of the highest quality, it was reported that 102 tons of wheat from the CVHA area was purchased by the new flour mill in 1982 and 66 tons in 1983 (less than 1% of total grain consumption by the mill).

(2) Maize: two superior producing varieties are grown at the farm at this time; Igarana 4, a short season (6 month) medium altitude corn and Kitale, a long season (seven month) high altitude adapted maize. At present ISABU does not have available the proper genetic maize materials for the CVHA area. Farmers need a short season improved yield variety so they can take advantage of two growing seasons each year. Dr. Bob Zeigler of ISABU is working on this problem, but high yield and long season are almost synonymous in corn.

Other geographic areas may offer markets for Igarana 4 and CVHA farmers who can afford and are willing to devote part of their land for seven months to maize are purchasing limited quantities of Kitale now.

(3) Beans: several varieties of bush type beans were grown at the farm in 1982-83 with poor results. At present there is no demand in the CVHA area for these bean seeds. If production problems can be overcome at the seed farm, and a high producing pole bean identified, new marketing channels inside or outside the CVHA area will have to be developed for bean seed produced in 1984 or 1985.

(4) Peas : This is the first year peas have been grown at the farm . An IDRC funded ISABU researcher is investigating varieties and technology recommendations. Market prospects are reported excellent over the long term.

(5) Sweet Potatoes: production problems, lack of adapted varieties as well as transport constraints have caused this crop to be eliminated for the time being.

(6) Irish Potatoes: this crop holds great potential for the CVHA area as well as for the seed farm. A Belgian-financed CIP researcher is conducting research trials on disease problems associated with bacterial wilt and late blight. If acceptable production levels of disease-free seed potatoes can be maintained and storage questions dealt with, this crop could be the most important in the near future. Much emphasis has been placed by the farm management staff on the potential sales revenues from this product. AID financing from the project, the team feels, should be allocated to the Burundi portion of the CIP/GRB potato research proposal (approximately \$340,000 for in country investigations over five years) for (1) potato research in identification of disease resistant varieties and (2) storage systems.

(7) Barley or other small grains that can be used in beer production may become an important cash crop in the CVHA.

(8) Certain GRB pressure is being brought on the BFC project to continue vegetable production on the farm to generate a cash flow. We do not believe this was the intent of the AID project. The farm may wish to rent this "bottom" land to a private farmer. The use of GRB labor and AID inputs to sell products of unknown production costs should be discontinued.

c. Technologies used

The project calls for several kinds and levels of advanced technologies to be applied in the AID seed multiplication component of the CVHA project. A brief review of these and their status is included for evaluation purposes :

(1) Identification and multiplication of superior genetic plant materials : ISABU is charged with the responsibility to select and provide improved foundation stock for the seed farm. At this point only two crops, wheat and Irish potatoes, are at acceptable production and yield levels for widespread

dissemination. Both of these staples require continued selection for higher producing, better adapted, disease resistant, varieties. Also needed is further ISABU development of low input small farmer cultivation technologies.

The other CVHA project food crops such as maize, beans, and peas may take several years yet to select or to develop lines that will perform at expected yield levels and have farmer approval in the high altitude production area. ISABU is working in Burundi on these crops.

(2) Mechanized farming and seed processing techniques : a basic premise of the project design was that intensive use of farm mechanization and modern technology could produce seeds at a price the farmers would purchase and at seed farm subsidization cost levels the GRB could afford. Unfortunately, mechanization levels are extremely low and practices that are carried on are done so incorrectly or so poorly as to be ineffective in lowering costs. Although a wide array of implements are available at Kájondi, the practical knowledge and experience levels of the U.S. funded advisors, have not been able to put these into operation. Field preparation, planting methods, fertilizer application, weed cultivation and pest management practices are all areas in which the contract farm manager and mechanic specialist have failed to meet project goals. Mechanization has not yet taken place in harvesting or seed processing due to improper equipment purchases (plot harvesters) or lack of installation and use of machinery on hand.

(3) Soils transformation and development: mechanical inputs as well as heavy use of chemical fertilizers and soil conditioners were used to balance pH levels and lower aluminium toxicity rates. In large part this effort has been successful on land worked to date. Follow-up toxicity studies and continued soil testing as suggested by short term experts is not taking place this year. Hard data on costs, documentation on methodologies used and

recent results of new fields were difficult to obtain. The team was impressed with the reports of short term technicians and hopes management will put into effect their recommendations especially those on acidity, aluminium toxicity, soils development and seed production.

A major unresolved technical issue in soils management is the cost and use of animal manure produced on the farm. The best solution seems to be the one presented by Dr. N. Ahmed, a short term consultant, to use the cattle in rotation with seed crops since land must, or should be, fallowed and the pastures could provide a useful purpose in any overall farm rotation plan. This would reduce the need to cut and carry forage to the cattle and lower the costly resources devoted to this activity.

d. Modern Farm Management Techniques

Through at least the end of 1983, a number of critical management and administrative procedures, many outlined in the project paper and Project Agreement, have been left undone. Future advisors of the Basic Food Crops project should sharpen the seed farm management and administrative systems to include basic data generation, analytical capabilities, and control mechanisms in at least these normal project operation areas :

1. CVHA annual work plans covering formal linkages and networking activities.
2. Cost and resource accounting system to provide reliable data on costs of operations, which is an essential input to
3. Five year farm development plan, including detailed budget estimates for land and farm development and all seed production activities.
4. Yearly plan of work approved by the GRB and AID.
5. Production activities to be geared to FED/CVHA estimated seed needs and other marketing opportunities.

e. Equipment and machinery at the Kajondi farm(1) Land preparation, seeding and cultivation

(a) The lack of knowledge at Kajondi in the proper use of the available equipment and inability to adapt, change, modify set-up, calibrate, and register the implements severely hampers current production levels at the farm. A few examples of improper or under-use of the present inventory of specialized equipment at the seed farm are cited below:

- The three hydraulic dump trailers have never been used as dump trailers. All materials are hand loaded and then shovelled off. A simple electric switch to activate the trailers' hydraulic motor has never been installed on any of the three Ford tractors.
- The goose neck attachments for the trailers, purchased to connect them to pick up trucks, and the electric brakes system have never been installed on any of the project trucks. Thus all movement of this rolling stock must be done with tractors.
- Sod breaking is done with disk plows not moldboards.
- Ungraded corn was used in a plate planter. The partial grading plates are available on the two plot harvesters, and might be used to grade corn until seed graders are put into operation later this year. Proper use of this equipment would have avoided the poor stand of this year's crop.
- The corn planters were never adjusted on the tool bar to allow for tractor wheel spacings which would have allowed later mechanical weed cultivation and fertilizer applications.

- The wheat drills are being used in a manual mode; that is, three men lift the drill head out of the ground at each turn row. No depth control can be achieved since the new hydraulic rams were never installed on the seeders. No mechanical depth adjustments were made on individual disk opener/planters, thus the sets that follow the tractor drive wheels do not drop down deep enough to open the furrow or cover the seed or fertilizer. No simple screen or wire mesh is used to screen out lumps of fertilizer as the drill is filled; thus later, during planting, the machine must be stopped every few hundred yards, field stripped, and the planter disks cleaned. This task is made even harder since there is no hydraulic system to raise the planter head. A twelve foot hydraulic hose could remedy the situation and a few dollars worth of screen could save a lot of down time. A chain or log trailed behind the drill would have helped cover the seed left on top of the ground.
- Cannibalization rates seem excessive for such new equipment
- No tractor drivers have been trained since the start of the project; the three that were hired are all they have, so tractor work is only done from 7 to 3 or overtime paid.

Drivers are often reluctant to work overtime and GRB policy discourages it because it 'adds to costs'. This is an untenable situation, since farm operations must be performed on time. No written maintenance schedules were available on equipment, vehicles, or buildings. There are some records on what repairs were made on some of the equipment.

No training plan or skills lists for in-service education activities have been developed for the staff in charge of mechanization.

(2) Harvesting Equipment

(a) Proper wheat harvesting equipment remains to be purchased. The two plot harvesters are not suited for a commercial operation.

(b) A corn sheller should be purchased. One model under consideration in Kenya could also harvest wheat. If this model or a stationary wheat harvester is bought, then a swather/binder should be purchased for wheat threshing work. A Brazilian pull type wheat harvester is also under consideration, as is an Indian manufactured thresher.

(c) Harvesting techniques for the corn, once a dryer and storage facility are constructed, must be changed from the present system. A suggested method and one used in Kenya is to pay hand labor on the amount harvested.

(d) A potato digger may have to be purchased.

(3) Storage and Seed Treating Equipment

(a) Construction of the building and installation of seed processing equipment needs to take place this year. Quality control on seeds sold must be initiated in 1984.

(b) Decisions on the potato storage system must be made and implemented in 1984.

(c) Short term technical assistance will need to be provided in 1984 to set-up seed processing equipment and teach GRB personnel its operation.

f. Research and data collection activities

Research and data collection activities being carried on by AID or GRB funded long term personnel under the Basic Food Crops Project are

inadequate to generate the knowledge which is required for keeping track of and learning from this effort. At least three levels of research and investigation should be encouraged in the remaining years of the project :

(1) On seed farm data Collection by Project Personnel:

- soil profiles by improvement methodologies, cost data production yields, time studies of chemical/physical improvement differentiations.
- Yield data on farmer native seeds grown under this cultural practice.
- Yield data on farm produced seeds, by land unit and by technology interventions.
- Production research; on seed farm cultivation practices, field yields, harvest data, pest and diseases-losses, storage methodologies vs seed losses, seed treatment practices, germination rates, cost data, and quality controls.
- Genetic records on plant material introductions, breeding histories, yield data and disbursement/dissemination records.

(2) Off Seed Farm, in CVHA Area:

- Seed production yields of Kajondi seed vs farmer varieties.
- Production techniques of CVHA clients as controls and ISABU recommendations for small farmer technology packages.
- Surveys of CVHA zones and other possible geographic sales areas on utilization of farm produced seed and incremental benefits derived by farmers therefrom.

Most of the studies in this category would best be carried out under the direction of the CVHA/FED-financed extension/dissemination activity. Two studies on the "spread effects" of the Kajondi/CVHA program are to be carried out in mid 1984 and late 1985. AID should participate in these exercises with funding and talent.

On farm collaborative research with other institutions.

- International organizations and regional institutions should be contacted and formal linkages established through ISABU. The farm should encourage CIP, IDRC, FAO, CIMMYT, IITA, ICIPE and others to have trials on the farm and assist the Kajondi staff with their crop production and genetic improvement problems. The team recommends that some funding be made available for this purpose.
- Host country agencies : more flexible working relationships need to be established and a broader interpretation on what agronomic investigations can be carried on at the seed farm by GRB/AID staff. An issue concerning rock phosphate is a case in point. Fertilizer trials with this Burundi produced mineral could not be carried out in 1983, recommended by a short term project soils expert because "investigations" are an ISABU responsibility. Tons of the material are weathering away and yet to be used because of this restriction.
- Educational institutions. There may be some limited role the BFC farm could play with in-country Burundi higher education institutions. However, the farm should not be seen at this time as a "Model Mechanized Teaching Farm", with students assigned to study there. This added

overhead and extra work for the staff cannot be justified with all the other problems the farm is encountering in trying to carry out its main mission.

g. Formal and Non-Formal Project Training

(1) Capital investments at the Kajondi farm for infrastructure development and seed multiplication processes are estimated to be about \$2.4 million. Development of GRB human resources to operate a farm of this magnitude after AID completes its funding obligations must be considered of prime importance for the remainder of the project. Master schedules covering formal and informal training for professionals and workers were not available to the evaluation team. These should be developed ASAP by AID/Burundi, project advisors and the GRB. Yearly work plans as well as an overall farm development scheme, which should contain a skills development list for key farm personnel, should be proposed. Several suggestions for a Kajondi in-service training plan are included below:

(a) Farm management and administration skills :

- management, labor relations
- crop production and seed multiplication systems (USDA, MSU)
- research design and analysis
- record keeping, inventory controls, labor use etc.
- cost analysis
- farm planning and development

NOTE. The majority of this instruction should be at the farm and provided by both long and short term U.S. technicians.

(b) Farm agronomist

- crop production and seed multiplication systems (CGIAR institutions)

- seed production, processing and quality controls
(CGIAR institutions)
- soils and fertilizers
- genetic improvement, plant breeding, and production records
- farm mechanization, harvesting, seed storage and processing techniques
- research techniques, analysis and results interpretation
- plant pest and disease management.

(c) Technicians and foreman

- maintenance, vehicles, tractors, equipment, machinery, specialized tools, buildings and infrastructure
- methodologies and techniques in equipment operation and mechanization for soil preparation, planting, cultivation, fertilization, pest management, roguing, harvesting, handling, drying, storage, seed treatment, quality control, packaging and sales
- chemical safety training, first aid, storage, handling and applications techniques
- crew chief training, maximum labor utilization, piece work and incentive payments.

h. Linkages with other AID Projects

FC Project should have active linkages with the new Farm Systems Research project (FSR) to be initiated during FY 1985. In addition to the possible seed varieties that may offer production potentials in the FSR area, the research and technology validations taking place at Kajondi and within the CVHA area will be part of the Burundi knowledge base available to the FSR implementation team. It is recommended that field survey results, findings from

extension methodology trials and specialists providing research and technical services to the projects be made available between these two AID programs, assisting the Ministry of Agriculture to increase agricultural production in Burundi.

4. Recommendations

1) Available records are not adequate to project highly accurate future budget needs. However, if minimal project purposes are to be met, full infrastructure development completed, GRB staff trained, and the seed farm turned over to the CVHA/GRB at an acceptable risk and subsidization level, the project must be staffed up promptly to meet present BFC operational needs.

2) Farm Manager/Agronomist

This principal advisor to the Farm Director will be concerned with the overall running of the farm, the development of training programs and their implementation, record keeping, and liaison with CVHA, ISABU, etc. He needs to initiate many new farm record keeping and inventory systems. He must be able to ascertain production costs by crop, field, year, technology levels, production methodologies, etc. He should be familiar with seed production and research techniques, as well as the agronomic problems of producing food crops. Micro computer experience in farm records, inventories and research analysis would be helpful. His outlook should be that of a teacher and team leader, who can interact at the farm, with AID, and between CVHA participants. He must have practical farming knowledge and experiences, have been a project manager and served in the capacity of instructor to his co-workers. He should be a hands-on administrator/teacher. He should have at least a S3-R3 French ability.

3) Farm Operations/Mechanic Advisor

The farm cannot be developed fully or obtain maximum efficiency during this project without the placement of a "farm operator" at Kajondi. The project

has not had full access yet to a corn and wheat farmer who can run, operate, maintain and repair the machinery needed to cover all production and processing activities on a seed multiplication farm. At this point, it may be preferable to provide an interpreter in French and /or Swahili or Kirundi, rather than attempt to find someone with these language skills. Most of the people that this technician will be instructing daily do not speak French, but a local dialect. A vocational Ag teacher or farmer/extension specialist at the M.S. level from the mid-west or California could do these tasks, especially if they had on-farm experience in the last 10 years. This position should be funded for the duration of the project.

C. Economic and Financial Analysis

(1) Introduction - Limitations of the Analysis

The analysis which follows is, unfortunately, largely impressionistic and abstract, rather than quantitative and precise. This was unavoidable given the circumstances of the evaluation and the current status of the project.

Three of the four team members arrived in Rujumbura with no previous knowledge of the project other than a reading of the Project Paper, and no knowledge of the current situation and problems. A large amount of time was consequently devoted to interviews, visits to various project sites, and literature review so that the role of the project in the agricultural sector, and its relations with sister projects, upon which it is dependent, could be understood (see Bibliography and list of Persons Interviewed).

The BFC project itself, and the agricultural research and agricultural extension and marketing projects of which it is only a part, are not far advanced at this writing. Consequently, very little factual information is available on which to base an analysis of project impact.

With regard to the financial situation and management of the farm itself, it proved extremely difficult to accurately determine even the most elementary financial and operating data. Farm records are inconsistent, incomplete, or lacking altogether, and the little information which has been accumulated is scattered among various offices at the farm and has never been usefully organized for analytical purposes.

Furthermore, there are a number of important unknowns remaining which will have a significant influence upon the future financial viability of the farm.

Each of these factors are discussed in more detail below. The reader is advised to put the analysis which follows in the context of a three week evaluation faced with the problems mentioned above.

(2) Economic Analysis of the Project and the Recurrent Cost Issue

a. Macro-Economic Considerations

The GRB currently finds itself in a difficult financial situation. Its ability to meet its funding commitments to the project is likely to be strained by increasingly tight budgetary and balance of payments shortfalls which are facing the Burundi economy generally (see January 1984 IMF report, "Burundi - Recent Economic Developments").

The following considerations are likely to affect GRB budget decisions on the project:

(i) The project is a key link in a much larger program attempting to address a very high priority problem in the agricultural sector. Expansion of development efforts for food crop production, and consolidation of gains already made in export crops, is the present strategy of the Ministry of Planning. Projects already under way and which are receiving donor financing, are accorded priority, and those which do not require GRB outlays of scarce foreign exchange are at a further advantage. The fact that Kajondi is an essential part of the FED-financed CVHA extension and marketing project is another factor in continued GRB support in the short run.

(ii) In the long run, other methods of meeting improved seed production needs will be explored. When it comes time to renew the machinery complement of the farm, if no donor funding or gift can be found, the decision whether to reinvest in Kajondi farm, or pursue other methods, should be made on the basis of return to investment. The farm will be at an advantage to the

extent that a considerable capital investment will already be in place (particularly with respect to soil development - on which see Financial Analysis below) and to the extent that management and cost problems have been brought under control. It will be at a disadvantage to the extent that it requires foreign exchange to function as a mechanized farm, and to the extent that management is still poor, and costs are still unknown and high. At that time, a decision might be made to operate the farm along less mechanized lines, in which case the seed processing plant and other farm infrastructure could still be exploited.

(iii) The farm has a psychological value to the nation which cannot be ignored. It is a highly visible project, and one which is very obviously part of an effort to move Burundi into a more modern and productive future. Very hard headed management will be required if this vision is to bear fruit, and by the same token, the effort should not be abandoned before it has fairly begun.

b. Foreign Exchange Implications

The foreign exchange balance of the farm is unlikely to become favorable in the near future. To clarify this point, an illustrative example has been prepared which indicates the magnitude of the changes which would have to come about before this might happen (see page III-33). The illustration is intended to demonstrate that if the farm were functioning at full capacity, and costing no more to operate than it does today, the value of foreign exchange saved at the mill would only be roughly equivalent to the value of foreign exchange required to operate the farm. Note that foreign exchange costs of distributing wheat seed, any foreign exchange costs incurred by farmer's use of

FOREIGN EXCHANGE BALANCE OF KAJONDI FAR

Assume:

1. That all wheat seed produced is planted, not eaten.
2. Farmer's average yield is 1.5 T/ha.
3. Farmers sow 100 kgs of seed per hectare.
4. 20 percent of all wheat produced from Kajondi seed is sold to the Muramvya mill.
5. Imported wheat costs FBu 35/kg.
6. Seed yield at Kajondi is 1 T/ha.
7. Foreign exchange costs of operating the farm are about FBu 20,000,000/year

EG POL	11,000,000
Fertilizer	4,500,000
Ag. Chemicals	500,000
Vehicle Maintenance	2,000,000
Machinery Maintenance	<u>2,000,000</u>
Total	20,000,000

Each of these assumptions are very favorable to the farm in light of circumstances existing today.

How many hectares of wheat would Kajondi have to grow to cover its own foreign exchange costs with foreign exchange savings at the mill ?

$$\frac{\text{Foreign Exchange Costs}}{\text{Savings per Ton of Wheat}} = \frac{20,000,000}{35,000} = 570 \text{ T}$$

$$\frac{\text{Tons of wheat delivered to the Mill by farmers}}{\text{Percentage of total production sold}} = \frac{570}{0.2} = 2,850 \text{ T}$$

$$\frac{\text{Tons of wheat produced by farmers}}{\text{Yield per hectare}} = \frac{2,850}{1.5} = 1,900 \text{ ha}$$

Total hectares sown to wheat x Sowingrate = 1,900 Ha x 100 kg/ha = 190,000 kg of seed.

$$\frac{\text{Tons of seed required}}{\text{Yield per hectare}} = \frac{190}{2} = 95 \text{ hectares of wheat, which is all the}$$

wheat the farm can reasonably be expected to produce when operating at full capacity. Therefore, the foreign exchange saving generated at the Muramvya mill may be enough to cover the foreign exchange costs of operating Kajondi farm, but no net foreign exchange saving should be expected.

imported inputs (e.g. pesticide, fertilizer), and the amortized cost of imported machinery and equipment have not been included.

The problem of saving foreign exchange is that Kajondi's operations incur a significant proportion of foreign exchange costs, but only wheat production 'saves' any foreign exchange. (Costs requiring foreign exchange will be found in Table 1,* which indicates that these costs have amounted to 40 percent to 50 percent of total operating costs per year). This 'saving' is dependent upon extension, marketing, distribution, and other agricultural activities which also consume foreign exchange. As one informant observed, foreign exchange savings generated by a mechanized seed production farm is a "theoretical idea".

c. Benefits to Farm Families

The benefits of the project to small farmers in the Mugamba cannot be measured at this time. Efforts to contact farmers and furnish them with improved seed and cultural practices have just begun. An adequate baseline study on which an evaluation of the CVHA project impact on farm family income, nutrition, and well being, could be based was completed just last summer, and has not yet been officially released (SOMEBU 1983). This study is in part a re-analysis of the CVHA project, and is the most complete and up-to-date analysis available of potential benefits of the CVHA project.

With respect to the BFC project and the farm at Kajondi, we note the following points (see also Crops - Annex E for further discussion of crops):

(i) The wheat production improvement program is almost entirely dependent upon Kajondi output of wheat seed. The two small seed multiplication

* All tables will be found following page 48.

centers at Muramvya and Ijenda have the capacity to meet less than five percent of project needs, and intend to concentrate on other seed crops.

(ii) The demand for seed potatoes is very high in the Mugamba. The FED extension project plans to develop a 50 ha perimeter in Mugamba Nord to help meet this demand, and the SSS is planning a potato production facility of similar size. Only Kajondi is potentially capable of producing any significant quantity of seed potatoes. Planned needs far exceed all planned production capacity.

(iii) The corn seed producing capacity of Kajondi exceeds the needs of CVHA, because a suitable variety of corn seed for the highlands has not yet been developed. However, corn is an important crop in many areas of the country, and improved varieties are available for areas outside the Mugamba.

(iv) The benefits that will flow from the CVHA project are in part due to putting an end to declining soil fertility and declining yields. These benefits will flow from extension activities introducing improved soil management and cultural practices, even if no yield improving technology is available. However, for extension workers to successfully contact farmers and gain their interest and confidence, some inexpensive input which offers an immediate benefit is needed. Wheat seed can play this role in the Mugamba. Thus the output of Kajondi wheat seed is an essential input to start-up of extension work in the highlands. Even farmers who are reluctant to invest in inputs can be contacted, since three methods of payment for improved seed are envisaged:

1. Payment in cash
2. Payment in tea leaves
3. Exchange of farmer's seed for improved seed.

The above arguments are intended to indicate the nature of the benefits due to investment in Kajondi farm which the government can expect in the short run. In fact, without Kajondi farm, the CVHA project will be in serious trouble immediately.

There are many uncertainties and unknowns in the farm's future (see Financial Analysis below) and regarding the effects of the CVHA project in the Mugamba region. Since the extension and marketing effort is only one year old, and has been largely experimental thus far, there is no real basis on which to forecast a rate of diffusion of new technologies, including improved seed. However, most experts agree (including Mr. Paquet, a senior technical advisor to the FED project, who spent 18 years in Rwanda developing seed multiplication and extension) that farmer acceptance of improved seed will be rapid, if the seed is truly better than local varieties. On the other hand, the potential for commercialization of food crop production appears limited. The Mugamba is a net food importing region, so a food deficit of unknown proportions will have to be made up before any "surplus" production is achieved. Prices appear to be highly variable seasonally and geographically but local markets are still poorly understood. Price consequences of increased local production are still a matter for conjecture. (See Quality and Price Considerations for further discussion - Annex G).

In sum, the national benefit derived from the project is a very difficult thing to evaluate quantitatively. A start has been made by the SOMEBU study (November 1983) which provides a fairly comprehensive baseline for studies of these questions in the future. Additional field studies of the CVHA project are planned for mid 1984 and September 1985. We urge all parties to

pursue this survey effort, and undertake a comprehensive assessment in late 1985 as planned. AID should participate in the studies being planned by SOMEBU which has already done good work for the Mission.

3. Farm Financial Situation

The financial analysis which follows is very unsatisfactory from a management point of view. Complete and detailed information on expenditures, resource use, and activities at the farm is not available. Farm records have not been kept in the form required for accurate cost analysis. No detailed farm budget has ever been prepared. Three of the four partial budgets in Annex F were prepared by Philipp Christensen of AID/B's agricultural office at the request of the evaluation team. They do not represent true costs, resource use, and productivity on the farm to the extent that they are not based on accurate records of past activities and assume field practices and a level of efficiency of management and operations which does not yet exist. Until recently, no comprehensive farm plan detailing rotations, land use, and work schedules had ever been prepared.

A previous evaluation (May 1983) recommended that "project management set up a sound accounting system for analyzing and planning future management decisions". This has not been done; consequently it is extremely difficult to evaluate the cost or profitability of any activity or crop on the basis of existing practices.

a. Capital Costs

Total capital costs are now expected to exceed Project Paper estimates by about 28 percent overall (see Table 2)*. USAID capital investment is 25 percent over PP estimates, while GRB capital costs have exceeded PP estimates by 55 percent (not counting the value imputed to land). This calculation takes inflation and contingency factors into account.

Capital investment is about 70 percent completed, with the seed

* : All tables will be found following page 48.

processing plant being the main unfinished item. This 30 percent of capital investment remaining is absolutely essential to the realization of project objectives, since without the seed processing plant, Kajondi will be a grain farm, not a seed multiplication center.

Return on investment by financial criteria will be negative. Machinery replacement costs approaching FBU 100,000,000 will have to be met within the next ten years. (No sinking fund has been established to cover these costs).

The major factor in USAID capital cost overruns has been building construction. (See Section A /Engineers' report/ for discussion of difficulties and delays). GRB overruns have occurred in both construction and farm supplies. The construction costs borne by the GRB are almost entirely due to reimbursement to contractors of taxes already levied on construction materials.

An important capital cost which was not foreseen is the investment in soil development on the farm. An estimate of this cost per hectare will be found in Christensen's Budget A (See Annex F). On the basis of this budget, it will be seen that:

Cost of Soil Development per Ha.	FBU 167,500
Hectares "fully developed" to date	x 65 Ha
Total cost of developing 20 percent of Kajondi farm	= FBU 10,887,500
	or \$121,580 U.S.

This amounts to roughly 15 percent of all operating costs to date. Since this cost is not broken out from true operating costs in farm accounts, it results in an inflated operating loss figure (see below).

b. Operating Costs

It does not appear at this time that the farm will ever be able to cover its operating costs out of revenues, unless a substantial improvement is made in the management of the farm.

The operating costs presented in the Table 3 are an estimate of total operating costs (both AID and GRB financed) for Kajondi farm from 1980 through 1986. These figures should be regarded cautiously, since even the values for each category of expense from 1980 through 1983 are only estimates from available records. The values from 1984 to 1986 are extrapolations based on the previous years' figures, and a number of assumptions specified in the Table. The same applies to revenue figures.

Several points should be noted with regard to operating costs to date:

(1) The hidden capital cost of soil development has inflated these figures historically perhaps by as much as 15 percent (see Budget A in Annex F). The necessity for extensive green manuring, manuring, liming and fertilizing operations has not only increased costs, but also delayed and reduced revenue.

The magnitude of the influence of this cost upon operating losses is indicated in Table 4B, Cost Sensitivity. The assumptions on which future costs were projected are consistent with this treatment to the extent that soil development continues in proportion to land under production as it has in the past.

Thus far USAID has financed the majority of these costs since all chemical fertilizers, POL, and most machinery maintenance costs except labor have been AID funded. Only about 20 percent of farm land is fully developed, and the necessity for continuing soil development operations will adversely

affect the farm's finances for years to come. Continued participation by USAID in the project, if found advisable, might in part be to help meet these costs, particularly the foreign exchange component.

(2) Personnel costs have inflated rapidly relative to Project Paper expectations and relative to other components of cost. 1984 personnel costs are estimated to make up almost 50 percent of total operating costs. The salaried staff and number of day laborers employed are presented in Table 5. At least three factors are at work in this problem.

First, Burundi social organization and the GRB method of staff and management lead naturally to what, by American standards, would be an enormous surplus of both salaried and wage labor personnel. This is a problem which GRB officials responsible for the project must solve in their own way. It is the single greatest obstacle management must overcome if the farm is ever to be financially viable.

Second, the efficiency of both hired labor and salaried personnel is very low. Numerous examples of this could be cited; all parties involved are aware of the problem. Both GRB managers and expatriate technical assistance personnel must take responsibility for training farm workers in efficient methods of work. This is, of course, easier said than done, but is a task which must be faced systematically, and on a daily basis. Virtually no attempts at staff training have been made to date at the farm.

Lastly, mechanization is not far advanced. Only field preparation has been fully mechanized in a satisfactory fashion thus far. Thus the need for wage labor is much greater than it should be. Technical assistance personnel are responsible for addressing this problem.

(3) POL costs have also inflated rapidly relative to other project costs, going from 12 percent of operating costs in 1980-1982 to almost 30 percent of costs in 1984. This is probably due to increasing operations, but misuse of vehicles and inefficient use of farm machinery doubtless contribute as well. This is another area for management to reduce costs.

(4) Two activities were introduced to the farm by the previous expatriate Project Manager which were not called for in the Project Paper.

Vegetable production was begun in the bottom land between hills 2 and 3. About three to five hectares are currently planted, primarily to cabbage, but also to onions, leeks, etc. This is a very labor intensive activity, and, given the efficiency of labor on the farm, the difficulties of vegetable marketing under the best of circumstances, and the distance to market from the farm, it is highly unlikely that any profit is being made.

A livestock activity was introduced to provide a reliable supply of manure for the farm. This is the method (mixed farming) strongly advocated by the Belgians, who have a small herd at each of their SSS seed production perimeters. A budget prepared by Christensen (Budget B - Annex F) estimates that manure produced at Kajondi costs over FBu 20,000, while it can be bought locally for less than 10 percent of that cost (although not always in the quantity or quality desired).

(5) Table 4 B, Cost Sensitivity, is intended to indicate the magnitude of savings which might be achieved given improved management of staff and machinery. Lacking any reliable information on true costs to date for any given activity, it is difficult to evaluate quantitatively the reductions in operating costs which could be reasonably expected from improved management and better trained staff. It is the consensus of the evaluation team, however, that such savings are probably considerable. It remains to be seen what can actually be achieved.

(6) The seed processing facility, (not yet built although most of the machinery has arrived) will add to costs. The only estimate available on the costs of operating this facility is roughly FBU 135,000 per week for fuel oil (1,500 liters) during grain drying operations (which might last for three weeks for corn, for example). There may be unforeseen costs associated with this facility.

c. Revenue

Revenues generated thus far have been inconsequential (see Table 3). The quantity of output has been far below expectations (see Tables 6 and 7). Furthermore, the farm has never produced a seed quality product. Instead, unprocessed, uncleaned, untreated grain from the farm has been sold as seed. Much of this has not been used for seed, but has instead been consumed.

The farm is only now beginning to produce wheat in quantity. Corn may remain a minor crop for several more seasons. Potato production for seed quality tubers is still experimental. (See Annex E for a discussion of problems and market potential of each crop).

Thus the future of farm revenue is still very uncertain, both on the production and the marketing sides of the question. Table 3 makes some fairly conservative, if optimistic assumptions about production and revenues through 1986. This table is not a forecast. It is intended to demonstrate the following points, when taken together with Table 4, parts A and C.

(1) The operating loss which will be sustained is relatively insensitive to wheat and corn yields and prices.

(2) Potato yields and prices on the other hand, have a very pronounced effect on farm revenue. In fact, the financial future of the farm

appears to depend greatly on the success or failure of potato production. For an excellent analysis of the potential profitability of potato production, see Christensen's Budget C - Annex F.

Thus the extent to which the farm will be able to cover its recurrent costs from revenue depends upon several factors which cannot be accurately evaluated at this time:

- (1) The extent to which improved management will be able to reduce costs and boost productivity.
- (2) The cost of operating the seed processing facility.
- (3) The prices which will be paid for farm products.
- (4) The success of still uncertain or untried production activities, particularly potato production, but also peas and, to a lesser extent, beans. (See Annex E - Discussion of Kajondi Seed Crops).

4. Recommendations

(1) There is an immediate need for an accurate, complete and usefully organized accounting system at the farm, which can be used for management decision making and cost control, and for a periodic summary of operating expenses and revenues.

The ideal would be a complete system of farm records which could be used to develop a farm budget based on the farm plan, with accurate partial budgets for each activity. This would probably require expatriate consulting services for some time.

A more practical, immediate approach to the problem might be to hire a local accounting firm to do the following things:

- a. A complete audit of the farm's books, resulting in a report on farm investment and operating expenses to date;
- b. Design of a simple format to make use of records already being kept on the farm for a monthly report summarizing expenses, revenues, and resource use by category and purpose; and
- c. Design of a format for an Annual Report based upon the monthly reports, which would show in some detail what was used to produce what, and at what cost.

Even if the first course is chosen, it would facilitate matters to also immediately follow the second recommendation as well. This would enable the expatriate consultant to begin his work on the basis of some background information, which it will otherwise be very time-consuming for him to acquire.

(2) Efforts to reduce labor and salaried staff costs should be a top priority. These problems need to be addressed by GRB personnel. Steps are already being taken in this direction. Expatriate technical assistance personnel must help to reduce salaried staff to an effective minimum. A comprehensive system of payment by piecework and improved organization of captains and crews, is needed to make efficient use of day labor. Increased mechanization is needed to further reduce labor costs.

This is the area of operating costs where management has its best opportunity to make significant reductions.

(3) POL should be controlled with a simple system of chits, which would keep track of the quantities consumed, for what purpose, and by whom. Fuel saving will become even more important when the seed processing plant is installed, and grain drying begins. An important element is the improved efficiency of field operations of machinery, which has been very low for certain activities. This is the responsibility of expatriate technical assistance personnel, who are most familiar with mechanized field operations. Since foreign exchange costs are a primary constraint for the GRB, close control over POL should be a high priority for farm management.

(4) Each of the problems mentioned above point to the need for training of HCN personnel. Every person on the farm has an important role to play in reducing costs and improving the efficiency and productivity of the farm. This is the most challenging task facing farm management. Primary responsibility for it lies with the expatriate technical assistance staff.

(5) A professional estimate of the costs of operating the seed processing facility given prices and conditions in Burundi, and expected through-put of each crop, should be solicited immediately. This is important both for the farm budget, and for the GRB, who will soon be responsible for POL, which is an important input for grain drying.

(6) Vegetable production should be phased out, perhaps by leasing the land already developed to local farmers.

(7) The livestock operation must be re-evaluated as soon as possible. It is costly, and not well integrated the way it is being conducted at present. Expert advice should be sought.

(8) Quality must take precedence over quantity in seed production. (See Annex G for discussion). Proper field practices must be introduced, and the seed processing facility must be made operational as soon as possible. Possibilities for processing the 1984 harvest of wheat should be explored immediately.

(9) If potato production should not prove possible at Kajondi for any reason, this should be taken as a warning to meet with GRB officials to further review the financial situation of the farm, and determine if a new strategy of investment and operations is in order.

(10) To the extent that ISABU is unable to meet the farm's need for foundation seed and breeder potatoes, it would be advisable to develop the capacity to produce foundation quality seed and potatoes on the farm. ISABU concurrence would be necessary for this.

(11) Other markets for the farm's products, especially seed corn and potatoes, should be explored. A broadening of the area served by the farm will increase its value to the nation to the extent that its potential output exceeds the needs of the Mugamba, and will provide added flexibility for production decisions.

(12) Do not plan farm production on the basis of selling to the Muramvya mill or Bujumbura markets. This is a waste of the investment and operating subsidy (See Annex G for discussion), and should be only considered as a last resort.

(13) Support the establishment of a premium price for locally produced grain at the Muramvya mill. This can provide a pull effect in the market which will facilitate establishment of a premium price for seed.

(14) The SOMEBU baseline study (November 1983) should be followed up with on-going surveys and a major impact survey of the CVHA project's effects in the Mugamba in 1985 as planned. SOMEBU is prepared and able to conduct such a study, and is at an advantage over other possible contractors in being already familiar with the terrain and the baseline study. AID should cooperate with SOMEBU on this study, and provide assistance as appropriate.

(15) Improved coordination with the other elements of the CVHA project would facilitate production decisions, supply of inputs, and distribution of outputs (especially potatoes, which are likely to pose major distribution problems). More frequent and more in-depth contact among all responsible persons is encouraged.

TABLE 1

Foreign Exchange Costs of Operations (FBU 000)	1980-82	1983	1984 (estimated)
POL	3,913	7,405	11,500
Fertilizer and Ag. Chemicals	7,601	4,030	4,000
Spare Parts	1,481	1,694	2,036
Machine Maintenance	448	448	1,725
T O T A L	13,443	13,577	20,463
Percentage of Total Operating Costs	41	38	52

CAPITAL

U S A I D

G R B

POSTS (\$000)	To date 1980-1983	Remaining 1984-1986	Total (Project Paper)*	To date 1980-1983	Remaining 1984-1986	Total (Project Paper)*
Construction	999.2	463.0	1462.2 (881.2)	153.7	56.3	210 (66)
Vehicles	131.2	40	171.2 (299.4)	-	-	-
Farm Equipment**	589.6	420	1009.6 (881.2)	50.1	-	50.1 (15.1)
Tool and Seed Processing Equipment	176.8	0	176.8 (190)	-	-	-
Acquisition and Clearing	-	-	-	34.7	5.0	39.7 (111.7)
TOTALS	1896.8	923	2819.8 (2251.8)	238.5	61.3	299.8 (192.3)

* : Project Paper estimates include 10 percent contingency and 12 percent inflation factors for USAID investment, but not for GRB investment.

** : Minor miscellaneous items, eg. furniture and office supplies, are included.

Rajon's Operating Expenses and Revenue

(Excluding costs of salary and housing expatriate staff)

<u>Operating Expenses</u>	(FBu000)				
	<u>1980-82</u>	<u>1983</u>	<u>1984</u> (Estimated)	<u>1985</u> (Projected)	<u>1986</u> (Projected)
Staff and Wage Labor	10,904	15,510	18,173	18,000	18,000
Office Supplies	*	488	250	250	250
Seed	366	-	1,019	2,000	2,700
Fertilizer, Lime, Manure and Ag. Chemicals	769	7,617	4,000	1,000	1,000
POL	3,913	7,405	11,500	15,000	18,000
Vehicle Maintenance	1,414	1,762	1,725	2,600	3,400
Machinery Maintenance and Rental	4,483	1,150	1,725	3,000	3,900
CVHA Transportation	250	1,104	400	400	400
Local Purchase Equipment	8,981	277	250	300	300
Miscellaneous	1,048	627	115	250	250
Research	327	-	-	-	-
Total Operating Costs	32,455	35,940	39,157	42,800	48,200
REVENUES					
Wheat	717	1,200	3,000	3,600	3,600
Corn	307.2	507.3	900	1,875	2,812.5
Potatoes	50.9	-	6,000	15,000	21,000
Total Revenue	1,075.1	1,707.3	9,900	20,475	27,412.5
Operating Loss	31,379.9	34,232.7	29,257	22,325	20,787.5
Total Revenue if there is no potato crop	-	-	3,900	5,475	6,412.5
Total Operating loss if no potato crop	-	-	32,257	37,325	41,787.5

* Subsumed under Local Purchase Equipment.

Assumptions for Operating Costs and Revenue
shown in Table 3

The operating expense and revenue projections were made on the basis of the following assumptions, and should be regarded only as indicative of possible future trends:

Assumptions

1. GRB does not expand salaried staff and is able to keep up with expanding production activities without hiring additional labor because of increasing mechanization of operations and improved management of the labor force.

2. The farm purchases all seed for its own needs and sells all of its own production. Seed purchases and revenues are based on the following acreages put into production:

<u>Crop</u>	<u>Seed Price</u>	<u>Hectares</u>			<u>Sale Price</u>	<u>Yield</u>
		<u>1984</u>	<u>1985</u>	<u>1986</u>		
Wheat	FBu 35/kg	50	60	60	FBu 30/kg	2T/ha
Corn	FBu 25/kg	18	30	45	FBu 25/kg	2.5T/ha
Potatoes	FBu 30/kg	10	25	35	FBu 30/kg	20T/ha

3. Increases in POL, vehicle and machinery maintenance costs are extrapolated based on the number of hectares in production.

4. There is sufficient fertilizer now in stock to meet requirements through 1986.

5. The costs associated with operation of the seed processing plant are not included.

6. No adjustments are made for inflation - costs and revenues are assumed to vary proportionally.

A. Price SensitivityNew Operating Loss and Percentage Change

	1984	%Δ	1985	%Δ	1986	%Δ
Wheat Prices increase						
15% 35f/kg	28,807	1.5	21,785	2.4	20,247.5	2.6
Potato Prices increase						
15% 35f/kg	28,357	3.1	20,075	10	17,637	15
Potato Prices decline						
15% 25f/kg	30,157	3.1	24,575	10	23,937.5	15

B. Cost SensitivityNew Operating Loss and Percentage Change

	1984	%Δ	1985	%Δ	1986	%Δ
15% reduction to compensate for soil development costs	23,383.4	20	15,905	29	13,557.5	35
20% per year reduction in personnel costs for two years	25,622.4	12	15,955.7	28	14,307.5	31
10% reduction in POL costs	28,107	4	20,825	7	18,987.5	8

C. Yield SensitivityNew Operating Loss and Percentage Change

	1984	%Δ	1985	%Δ	1986	%Δ
Wheat yield increases						
50% 3T/ha	27,757	5	20,525	8	18,987	8.6
Corn yield increases						
20% 3T/ha	29,077	0.6	21,950	1.7	20,224.5	2.7
Potato Yield declines						
33% to 15T/ha	31,257	6.8	27,325	22.5	27,787.5	33.7

List of Salaried Staff at Kajondi*

<u>Title</u>	<u>Monthly Salary</u>
Chief Agronomist	30,000
Senior Agronomist	25,000
Agronomists (2)	25,000
Tractor Drivers (3)	12,500
Assistant Tractor Drivers (3)	8,000
Chief Mechanic	30,000
Assistant Mechanics (3)	15,000
Truck Drivers (2)	12,500
Light Truck Driver	12,500
Driver	15,000
Assistant Driver (2)	8,000
Accountant/Personnel Manager	25,000
Cashier	12,500
Office Manager	13,000
Secretaries (2)	11,000
Warehouseman	12,500
Guard	6,000
Wedder	12,500
"Agent de Liaison"	25,000
32 persons at a cost of 476,000 Fbu/month	
Or \$4,140 U.S./month	

Day laborers are paid 90 Fbu per day

Two capitas are paid 150 Fbu/per day

Other capitas are paid 120Fbu/per day

Total allocated to day labor per month : 830,600 Fbu

Less salary of two senior capitas

2 x 150x24

7,200

Leaves 823,400

If each junior capita supervises nine men, the cost for a 10 man crew is

$120 + 9 \times 90 = 930$ Fbu/day

or an average cost per man of 93 Fbu/day

$\frac{823,400}{93} = 8,850$ man days per month or $\frac{8,850}{24} = 370$ persons per day

* Does not include salary of Farm Manager

TABLE 6

Comparisons of Farm Production of Seed to PP Plan M. Tons	1982		1983		1984		1985		1986	
	Actual	PP	Actual	PP	Planned*	PP	Planned*	PP	Planned*	PP
Wheat	20	233	46	233	108	233	120	233	94	271
Corn	7	75	33	75	112.5	75	157.5	75	115	88
Potatoes	18 ^a	29	-	233	150 ^b	233	1120 ^b	233	920 ^b	268
Peas	-	5	-	90	2.2 ^c	90	13 ^c	90	26 ^c	80
Beans	-	1.5	-	20	13.5 ^c	20	40.5 ^c	20	87 ^c	18
Sweet Potatoes	-	37	-	407	d	407	d	407	d	256
TOTAL	45	380.5	79	1058	386.2	1058	1451	1058	1242	981

a. not seed quality

b. depends on suitability of Kajondi soils for this crop and institution of effective management practices

c. depends on development of an improved variety, and suitability of growing condition at Kajondi

d. no longer in farm plan due to impracticality of distribution of cuttings to farmers

* Plans for these years have been scaled back considerably from the quantities indicated here.

Comparisons of Farm Activities to PP Plan (Ha)	1982		1983		1984		1985		1986	
	Actual	PP	Actual	PP	Planned*	PP	Planned*	PP	Planned*	PP
Wheat	10	117	46	117	54	117	60	117	47	136
Corn	8	30	15	30	45	30	63	30	45	35
Potatoes	1.25	2	-	18	10	18	56 ^b	18	46 ^b	21
Peas	-	5	-	90	2.2 ^b	90	13 ^b	90	26 ^b	80
Beans	3.75 ^a	1.5	-	20	9 ^b	20	27 ^b	20	58 ^b	18
Sweet Potato	-	3	0.5	34	c	34	c	34	c	21
Sub Total	23.0	158.5	61.5	309	120.2	309	219	309	223	311
Green Manuring	20.5	-	71.5	-	217	-	120	-	115	-
TOTAL Ha	43.5	158.5	133.0	309	337.2	309	339	309	338	311

a. none harvested

b. depends on seed availability, determination of suitability of Kajondi for this crop

c. no longer in the farm plan - no practical way to distribute cuttings to farmers

* Plans for these years have been scaled back considerably from the quantities indicated here.

96

TABLE 8

GRB Provisional Budget (1984)

Construction		9,000,000
* Potato Storage	500,000	
* Machinery Shed	500,000	
* Seed Processing Bldg.	8,000,000	
Equipment and Supplies		2,849,000
Agricultural supplies	600,000	
Office Supplies	1,000,000	
Seed	1,249,000	
Personnel		18,172,321
Salaried Staff	6,554,716	
Additions to Staff	1,000,000	
Day Laborers	9,967,605	
(Calculated at 830,634 FBU per month)		
Social Security etc.	650,000	
Travel Expenses		400,000
Building Maintenance		1,000,000
POL		90,000
*Expropriation fees		800,000
Miscellaneous		250,000
		<hr/>
	TOTAL	32,561,321
	OR ~	32,600,000 FBU
* Capital Costs	OR ~	\$285,000 U.S.

D. Institutional Considerations

The institutional development of the Kajondi farm and of the CVHA program as a whole has only just begun. Although the CVHA program was proposed in 1978, external assistance in support of institutional development did not become effective until 1981 in the case of the farm and two years later in its FED-assisted extension/dissemination component. Advisory services and training, particularly the latter, have been so limited to date that they only had a slight impact on improving the capacity of these institutions to carry out their functions.

The institutional context of the BFC project has elements of strength in its behalf. The CVHA program enjoys considerable priority within the country's plans for the agricultural sector. The 1983-1987 development plan, recently made available, gives high priority to food crop production, a significant shift from the emphasis on export crops of earlier plans. The Kajondi farm and the CVHA program enjoys considerable prominence within this effort. They are located in, or serve, the Mugamba region which is the home of much of the country's leadership. The farm itself is a few miles from the President's home and was the scene of a recent dedication over which he presided. The Kajondi farm is a high visibility undertaking to which a certain amount of institutional prestige has been committed.

Another aspect of the farm's institutional context is its linkages with other Burundi agencies. As noted elsewhere, the farm must rely on three other agencies at present for essential inputs of genetic material and marketing of farm products and the creation of a commercial market for farmers products. The first of these is ISABU, the country's National Agricultural Research Institution.

ISABU is responsible for developing appropriate varieties of food crops, and producing the foundation seed which the Kajondi farm will multiply. Success in the search for superior varieties has been limited to date (see Annex E). ISABU's production of foundation seed has not been sufficient to meet the needs of all seed multiplying farms in the country. ISABU has legal authority over all seed importation as well.

ISABU is also responsible for providing technical recommendations to the extension service for dissemination to farmers. This is a new role for ISABU, which has been recently given a strong impetus by an evaluation conducted by FAO of the relevance of ISABU's research to the needs of the country. True farm systems research is still unknown in Burundi, but steps are being taken (including a new USAID project) to introduce it.

The FED is funding the extension and marketing component of CVHA, the second agency upon which the project depends. They began operations in the spring of 1983, three years behind schedule. Extension work has been very limited to date and understanding of the farming systems and farm economy of the target area is still very incomplete. The FED technical assistance team, now at the end of their first year, have just rewritten their project and budget in order to address the problems of the area more effectively and with more realistic (limited) short term objectives. The seed farm at Kajondi is an essential part of this new plan.

The third agent in the CVHA project is the new flour mill at Muramvya. In operation since 1982, the mill imports some 10,000 tons of wheat per year from Europe in order to meet about 60 percent of Burundi's need for wheat flour. Only 168 tons of locally produced wheat has been purchased by the mill in two

years of operation. The mill offers local farmers a price based on the CIF price of imported wheat. It is doubtful whether this price will provide sufficient incentive for any significant increase in local production, since it is often lower than the local market price (see Annex G on Quality and Price).

It is apparent, therefore, that the performance of the farm is closely linked to the activities of these other agencies and that consultation and cooperation among them is an important ingredient of mutual success. Unfortunately, such liaison activities have not received enough emphasis by AID/Burundi or its contract staff and a greater effort in this direction is strongly indicated.

A third aspect of the farm's institutional context is its relationship to national seed multiplication activities. Seed multiplication in Burundi is currently undertaken by some 43 agencies, mostly at various small centers scattered about the country. The two most important seed multiplication projects currently under way are the CTB-assisted Service des Semences Sélectionnées, and the Kajondi Seed Farm. It is vitally important that these, and other seed producing organizations, coordinate their activities so that the needs of Burundi for improved seed can be met with a minimum of waste and duplication of efforts.

A recent (February 1983) FAO consultant (F.W. Bellon) reported on the development of seed multiplication in Burundi, and laid great stress on the importance of establishing a National Seed Multiplication Council, which would have the authority to control, coordinate and support these efforts. The evaluation team recommends that AID/Burundi strongly support this recommendation and likewise encourage its support by CVHA and the FED. The Farm Director and the AID-financed senior advisor should take an active role in the work of

the proposed Council.

The development of the farm as an effective institution is influenced by its status as a parastatal agency. Although all concerned have a strong desire to see the farm succeed, the fact that it is subsidized by the government tends to dilute incentives to cut costs, increase revenues, reduce losses and apply rigorous management techniques. Like so many state farms, there are tendencies to add redundant personnel, to stretch perquisites, to allow lax supervisory practices and to treat farm property with indifference. More generally, there is the sense that the farm is not being run as a "tight ship"; that many functions are carried out by rote, that there is a lack of understanding or interest in the purpose of farm tasks, and that management styles are extremely formalized and do not encourage initiative or informal communication.

Although the farm has a priority claim on government financing (through the Extraordinary Investment Budget), there are obviously limits to the drain it can cause, particularly during a period of budget retrenchment and foreign exchange austerity. Also, there is no certainty that AID will wish to continue its participation after the next two and a half years. Accordingly, those in charge of the CVHA and the farm will need to think more in terms of running the operation as though it were a commercial enterprise. A number of suggestions along this line are offered in the section on criteria for the next evaluation and in the report's recommendations.

The future of the farm as an institution will also depend on the number and competence of its professional staff and this, in turn, will be greatly influenced by staff training. Providing adequate training is difficult

because it involves taking scarce staff away from their work. Nevertheless, as noted in the agricultural section of the report, the team believes that training at all levels must be strengthened during the years ahead. Additional Burundi agriculturalists, perhaps promising students from the University, should be sent abroad for academic training to meet the farm's needs for future talent. Practical short term training on technical subjects and in management should be offered to the farm's professional staff with particular emphasis on courses offered by the CGIAR centers and african management centers like the PAID in the Cameroon and Upper Volta. Finally, a vigorous and sustained program of on-the-job training is needed and should become a major priority of the next team of U.S.-financed advisors. It should also become a major function of the current Burundi staff, so that understanding and skills are developed throughout the personnel of the farm. On-the-job training has been a major shortcoming in the program so far and needs to be rectified during the next phase.

IV. RECOMMENDATIONS

A. Introduction

The evaluation team is very conscious of the fact that both the OAR and AID/W were looking to it to help diagnose the problems of the BFC project and to recommend a clear cut course of action for dealing with them. If past project performance, progress toward objectives, and current or near term financial viability were the only criteria for reaching a judgment, it would be obvious that the project was in such deep difficulties that AID participation in it should be brought quickly to a close.

As indicated in the Section I Summary, however, the team believes that there are other considerations which argue for continued persistence in attempting to address the problems that are confronting the project. Despite its other limitations, the Project Paper was correct in identifying the declining productivity of Burundi's higher altitude farmers as a critical national problem. It was also correct in designating AID participation in the High Altitude Food Crops program as a conceptually important way in which AID could join with other donors to address that problem. Improved, more reliable seed is one of the few improved agricultural inputs that the small highland farmer can afford and that could materially increase his per acre yields. Thus the BFC project and its companion research and extension interventions have great potential for benefitting a major area of the country.

Other considerations that weigh in favor of continued AID participation are the importance the GRB attaches to increasing domestic food production as articulated in its new Five Year Plan, the expectations this high visibility project has raised, and the fact that the related research

and extension interventions in the program are counting on BFC to play its part. As the economic analysis makes clear, without the Kajondi seed multiplication farm, the CVHA program for the Mugamba will be in serious trouble.

For these reasons, the team believes that the project should be allowed to continue during its remaining term to see whether some of its potential can be realized. But obviously, just providing time is not enough. An entire fresh start must be made for improving management, implementation performance and the quality of technical skills at the scene. This will require a vigorous and dedicated effort on the part of AID in Bujumbura as well as technical and institutional support on the part of REDSO/ESA and AID/W. Of critical importance will be the provision of qualified managerial and technical personnel with the necessary language skills to work at the farm. A new and better mode for obtaining such services must be found quickly and the responsible backstopping offices in AID/W will need to give this matter high priority. But management and attitudinal improvements must start with those closest to the scene.

AID actions must be accompanied by improvements in Burundi performance as well. A series of steps to rigorously cut farm operating costs should be undertaken, including especially labor costs. A system of compensation by piecework needs to be established to increase labor productivity. Changes in managerial style need to be instituted to encourage a greater sharing of responsibility and information. A qualified Assistant Farm Director should be recruited to assist in running the farm and expanded training opportunities should be pursued. A number of Burundi "policy" measures also need to be taken (see policy recommendations, page IV-9 below).

There is no guaranty that even if AID and the GRB are able to perform in the manner recommended that project success will follow. As noted in the introduction to the economic and financial analysis, there are many external factors that could have an important beneficial or detrimental impact on the project's future. However, it is virtually certain that without an improved and strenuous effort on the part of AID and the GRB, the project will fail.

As of April 1984, the project still has two and a half years to run, that is, through FY 1986. Existing funding should be adequate through FY 1985 (see Table, Annex C), but additional funding of between \$0.5 - 1.0 million will be required for project activities in FY 1986 if technical assistance is brought on board promptly, the team's recommendations on technical assistance and research are followed and AID agrees to postpone for a year the GRB commitment to finance half of the project's remaining operating costs. The team suggests that AID/Burundi advise AID/W of this possible requirement at the time it provide the evaluation report to Washington.

Project disbursements should be followed closely so that the Mission can request additional funding next year if that is necessary to finance project activities in FY 1986. However, the team is reluctant to recommend a further extension in the PACD in the absence of an improvement in project implementation, progress in executing the recommendations offered in this report and a better indication that project outputs are beginning to contribute to Burundi agriculture in the Mugamba region.

Another in-depth review of the project and the CVHA program generally should be held in May/June 1986. Yardsticks for measuring project progress and improved management are proposed in the following section. By then too the reviewers should have available the results of the "impact" studies, based on sample surveys, which SOMEBU is planning to carry out later this year and in September 1985. AID should participate in this work with both financing, if needed, and talent. If necessary arrangements can be worked out, it would be of great benefit to all parties if the next review could be conducted jointly with the FED so that the two interrelated programs can be assessed at the same time and decisions on one can be taken with knowledge as to their impact on the other.

If the results of the next review are positive, the Mission should use the review report as the basis for requesting an interim extension of the PACD to allow time for the design of a follow-on project and the review of the Project Paper by REDSO/ESA and AID/W. Interim funding may also be necessary to continue project operations during that period. On the other hand, if the results of the review are negative, the Mission will have the remainder of FY 1986 to bring its participation in the project to an orderly conclusion.

B. Criteria for 1986 Review

The following criteria are proposed on various aspects of the project as a means of assessing progress in project management and results at the time of the 1986 review. They should be used with discretion as changing circumstances may cause some to become inappropriate while others become more meaningful.

Farm Management

- a. Annual Farm Plan: Establishment of an annual plan for farm operations, based on resource availability (funding, equipment, labor, etc.) and production goals determined in conjunction with CVHA and other purchasers of farm products. The plan would specify land use, work schedules, and serve to identify potential bottlenecks and production problems.
- b. Farm Budget: A comprehensive budget, based upon the activities in the Farm Plan, and specifying cash flow and input requirements, should be prepared for each season, if not each year.
- c. Management Information System: A system for cost and operations control must be developed. This will require an accounting system for keeping track of resources consumed by each activity (financial and physical inputs), and a simple reporting system, so that this information is made available to management in an immediately accessible and useful form. This will facilitate preparation of Monthly Reports, and the Annual Report, as called for under Financial Criteria below.
- d. Training: Plans for training programs in each major area of farm operations should be drawn up, and an effort made to identify progress made in training in each of these areas. This will require assignment of individuals to tasks and/or crews, so that their experience in an activity may accumulate, and their efficiency improve. Higher level on-the-job training may be accomplished more informally, since the evidence of its success will be obvious in the quality of management, reports, farm fields, and farm products.
- e. Labor Management: A comprehensive system of piecework payment, together with an improved system of foreman-crew relationships, and crew-field or crew-task relationships should be developed. Improved labor efficiency, reduced

labor costs, and improved farm productivity should be in evidence.

f. **On-Farm-Trials:** Agronomic and soils studies should be conducted in a systematic manner, and the data so gathered collected seasonally and analysed. Management should be able to indicate improvements which have been made in the agronomic management of farm operations on the basis of these studies.

g. **Equipment Maintenance and Repair Records and Schedules:** A maintenance schedule, and a record of maintenance and repairs performed, should be kept on each vehicle and major piece of equipment.

h. **A Deputy Farm Director:** Continuity of Burundi farm management must be assured. It is recommended that a second in command be always in training for the Farm Directorship. This person should be able to manage the farm in the Director's absence, and take over his role should he be assigned elsewhere.

TECHNICAL CRITERIA

a. **Yield Samples:** Procedures for sampling yields of each crop, field, and individual plot (if conditions warrant this) should be instituted. These results to be correlated with records of field preparation, planting dates, treatments, soil studies, weather, etc., in order to improve agronomic and financial management of the farm.

b. **Soil Profiles:** Regular measurements should be taken to determine aluminum toxicity levels and soil pH (at least twice a year - between each cropping season). Soil fertility studies, to determine the effectiveness (both absolute and in terms of cost) of soil treatments, should be done to the extent possible. Development of farm soils should be related to the

development of markets for farm products.

c. Quality Controls: Each aspect of quality seed production must be assured by farm management. Field controls (roguing, pest and disease control, field location relative to neighboring crops, etc.) must be introduced.

Harvesting, handling, and processing must be conducted with quality of the product always in mind. Kajondi seed should meet strict requirements (within the limits of practicality) for purity, germination rate, and freedom from contamination and disease. Farm products should be packaged distinctively, and in lots appropriate to the requirements of the markets being served.

Seed treated with hazardous products must be clearly marked (preferably dyed).

d. Liaison with International Centers: Establishment or strengthening of collaborative research/technical assistance relationships, through ISABU, with international research centers including CIMMYT (wheat and corn), CIP (potatoes), IITA (corn, beans, root and tuber crops), and CIAT (beans) to upgrade quality and dependability of Kajondi seed. Of particular urgency is assurance of continued CIP research on breeding and storage of potatoes. Also indications that this knowledge base is being used by FED and providing inputs for the new Farming Systems Research project scheduled to start in 1985.

FINANCIAL CRITERIA

a. Monthly Reports: Showing expenses, revenue, resource use (land, labor, inputs, tractor time) and production activities. Based upon the Management Information System, the report should be organized to present costs and resource use with reference to production activities. All information which will later be incorporated into the Annual Report should be available in the Monthly report to facilitate that task.

- b. Annual Report: Just as the Monthly Report, but for the entire year, and showing the operating loss (or profit) sustained, and offering explanations for problems encountered, and plans for the coming year.
- c. Cost Control Targets: On the basis of the Management Information System, cost control measures and targets to be instituted, especially with respect to items costing foreign exchange, and wage labor.
- d. Accurate Partial Budgets: The cost of production of each crop on a per unit basis should be determined with reference to actual production methods and costs on Kajondi Farm. This information to be used in price policy discussions with ISABU and CVHA/FED, and for the preparation of the Farm Plan and Farm Budget.
- e. No increase (preferably a decline) in the number of salaried staff.
- f. Establishment of a depreciation schedule for farm equipment and machinery.

ECONOMIC CRITERIA

- a. Evaluation of National Benefits: A field study in the Mugamba will be needed to survey the impact the CVHA project has had upon farmers and their families. An estimate of the economic value of this benefit should be made, for comparison with the economic cost of the CVHA project.
- b. Return to Investment in Kajondi Farm: Improved farm financial records and reduced operating losses should make comparison of the return to Kajondi farm with the return to investment in other types of seed multiplication centers a viable and useful criterion of the value to Burundi of Kajondi Farm, particularly with regard to continued investment in mechanized seed multiplication.

c. Development of a Price Policy: ISABU, Kajondi Farm, CVHA/FED, and the Muramvya Mill must establish a coherent price policy for seed and grain.

Four prices must be considered:

- 1) Price for local grain at the Mill;
- 2) Price for Kajondi seed paid by farmers;
- 3) Price for Kajondi seed paid by the FED/CVHA project; and
- 4) Price for foundation seed paid to ISABU.

CONSULTATION AND COORDINATION

a. Technical: Contract Senior Advisor and Farm Director meet monthly with CVHA and ISABU and quarterly with other seed production/distribution agencies to share information, coordinate planning and to identify seed extension needs of the Mugamba and other areas. Information so developed to be utilized for the preparation of the Farm Plan. Establish closer linkages with SSS to share production goals, exchange technical information and reduce competition for ISABU foundation seed.

b. Program: AID/B to meet at least once every two months, preferably at an on site location, with other agencies and donors involved with seed production/distribution (FED, TCB, SSS, SOMEBU) to discuss problems, needs and ways in which the donors can cooperate more effectively in supporting Burundi crop production.

c. Policy:

- i. AID/B to join in support of establishing the National Seed Service, as recommended in the Bellon Report.
- ii. GRB to establish an incentive price at which the flour mill will purchase locally produced grain.
- iii. GRB assumption of 50 percent of operating costs in 1985, and at least 75 percent of operating costs in 1986.

C. Recommendations

1. Program and Funding Recommendations

- a. The team estimates that additional funding of \$0.5 to \$1.0 million will be required to finance project activities through FY 1986. Disbursements should be followed closely and additional funding provided in FY 1985 after a more precise estimate on FY 1986 requirements is made. The team would support a request for such funding if necessary to see the project through to its current PACD.
- b. A further evaluation of the project should be scheduled for May/June 1986. The criteria listed in the previous section should be used as a means of measuring the project's status and progress.
- c. If the evaluation is positive, AID/W should provide interim financing, if necessary, and a few months extension of the PACD to allow time for the design and review of a follow-on project. Obviously, if the reverse is true, Mission efforts should be devoted to an orderly project close out.
- d. Research on disease resistant potato varieties and on storage problems should be pursued through implementing the Burundi portion of the CIP potato research proposal (PROPAC). Early advice is needed on storage questions.

2. Personnel and Training Recommendations

- a. Although not contemplated in the Project Paper, the farm operator mechanic advisor position needs to be continued for the remainder of the project.

b. A short term seed processing expert should be present at the time the seed processing plant is being laid out and starting up. That person should return to review the situation after a period of the plant's operation.

c. A training plan should be established for the development of the farm's human resources. Short term, practical training should be provided to the farm's present staff, utilizing the relevant training facilities of CGIAR agricultural research centers. Long term academic training should also be provided to promising candidates not now with the farm, so that competent technical staff will be available in the future.

d. On-the-job training will be a critical part of the future responsibilities of the technical assistance staff. It should constitute a key qualification for recruiting resident experts. Training needs, technical and managerial, are evident for the whole range of the farm's personnel.

3. Engineering Recommendations

a. The Mission should take steps to acquire an engineer under a Personal Services Contract. Since most of the construction on this project has been completed, it is recommended that this position be funded under another project.

b. On-call periodic consultations with the TRIAD engineer should be arranged.

c. Conclude arrangements for training in tractor maintenance and repair with Ford at a center in France.

d. Prepare a list of remedial works remaining from the COMIBURUNDI contract; likewise firm up list of additional work with costs and assign action.

9/11

GLOSSARY OF TERMS

<u>Acronym</u>	<u>Explanation</u>
A/E	Architectural and Engineering firm.
BFC	Basic Food Crops project, to establish a seed multiplication farm at Kajondi as part of the High Altitude Food Crops program.
CADI	Centre Agricole du Développement Intégré - Integrated Agricultural Development Center. CADIs operate where SRDs have not been established.
CGIAR	Consultative Group on International Agricultural Research - a World Bank led association of international research centers financed by a number of donors including the U.S.
CIAT	International Center for Tropical Agriculture - The CGIAR Center for beans, rice, cassava and tropical pastures. Located at Cali, Colombia.
CIMMYT	International Center for Maize and Wheat Improvement - The CGIAR center for maize, wheat, barley. Located at Mexico City, Mexico.
CIP	International Potato Center - The CGIAR potato center located at Lima, Peru.
CTB	Coopération Technique Belge (Belgian Technical Cooperation) - The technical assistance agency of the Belgian government.
CVHA	Cultures Villageoises en Haute Altitude - The special agency established by the Ministry of Agriculture to implement the High Altitude Food Crops Program in the Mugamba region of Burundi.
FED	Fonds Européen de Développement (European Development Fund) - The development finance agency of the European Economic Community located in Brussels.
GRB	Government of the Republic of Burundi.
HCN	Host Country National - i.e. a citizen of Burundi.
IFB	Invitation to bid. A solicitation to a firm to prepare a proposal to perform engineering or construction services.

AcronymExplanation

IITA	International Institute of Tropical Agriculture - The CGIAR Center on food crops, especially cereal, legume and tubers. Located at Ibadan, Nigeria.
ISABU	Institut des Sciences Agronomiques du Burundi - The National Agricultural Research Institute of Burundi. Its center at Gisozi specialised in high altitude food crops.
LOP	Life of Project - The duration of a specific project, i.e. between the date of the Grant Agreement and the PACD.
MINAGRI	GRB Ministry of Agriculture and Livestock.
MPW	Ministry of Public Works
OAR	Office of the AID Representative, i.e. AID/Burundi
PACD	Project Assistance Completion Date - The official date on which a project ends.
PIO/T	Project Implementation Order/Technical Services - an internal AID implementing document.
PLAN	Ministère à la Présidence chargé du Plan - The Ministry of Plan is within the President's office.
ProAg	Project Grant Agreement - A legal agreement between AID and a developing country agency to finance and execute a project.
PSC	Personal Services Contract (normally between an individual and AID to provide expert services on a subject)
SOMEBU	Société Mixte d'Etudes du Burundi - A Burundi based engineering and social economic consulting firm with linkages to firms in Europe.
SRD	Société Régionale de Développement - Semi-autonomous regional development agencies being established in various locations by ecological zones.
SSS	Services de Semences Sélectionnées - The seed extension service of the Ministry of Agriculture with assistance by CTB.

Team Contacts in Burundi

<u>NAME</u>	<u>TITLE</u>	<u>ORGANIZATION</u>
Joseph KAFURERA	Director General	ISABU
Gunnar E. RING	Advisor to FED Delegation	FED
Emile BONTE	Head of the GRB Seed extension service	SSS
Albert CAPELL	Management and Marketing Consultant	CVHA/SOMEBU
Salvator SAHINGUVU	Director General of Agricultural Planning Division	Ministry of Agriculture
Alain CAMERMAN	Coordinator of Agricultural Projects	CTB
Jean-Jacques BOURGE	Plant Protection Expert	SSS
Stephan REEL	Director General	SOMEBU
Jean Noël DEMEESTER	Chief of Mission of the Technical Assistance at the CVHA	SOMEBU
Dr. Mike POTTS	Chief of the Irish Potatoes Program	ISABU
Dr. R. ZIEGLER	Chief of the Peas and Corn Program	ISABU
Jean Dominique GELY	Advisor to the Director General of Program and Rural Division	Ministry of Plan
Tharcisse GUSUGUSU	Advisor to the Director General of Program and Rural Division	Ministry of Plan
Prof. Clément MATHIEU	Professor at the Faculty of Agronomy	University of Burundi
Ravic HUSO	EGON Officer	U.S. Embassy

AID/Burundi Personnel

George T. Bliss - AID Representative
 Sally R. Sharp - Program Evaluation Officer
 Stanley Wills - Agriculture Officer
 Kebrom M. Tesfamichael - Budget and Fiscal Officer
 William J. Grant - PSC
 Philip Christensen - PSC

ANNEX C

Basic Food Crops Budget Estimates FY 1980-86 (AID Contribution)

(\$000)

Item	Fiscal Year				
	1980/83 ^a	1984	1985	1986	Total
Construction	1,000	443	-	-	1,443
Vehicles	171	-	55 ^c	-	226
Farm Equipment	631	389	-	-	1,020
Furniture and Appliances	31	1	-	-	32
Local Costs ^b					
POL	126	100	65 ^d	35	326
Fertilizer and Chemicals	215	375	-	-	590
Purchase, rental & Maintenance of equipment	90	30	18	7	145
Other	104	45	29	12	190
Subtotal	<u>535</u>	<u>550</u>	<u>112</u>	<u>54</u>	<u>1,251</u>
Participants					
Long Term	58	30	30	30	148
Short term	24	25	20	20	89
Subtotal	<u>82</u>	<u>55</u>	<u>50</u>	<u>50</u>	<u>237</u>
Technical Services					
Farm Manager/Agronomist		180	150	160	390
Farm operator/Mechanic		60	140	150	350
Records Management Services		80	80	-	160
Seed Processing Expert (3mths/yr)		32	32	-	64
Impact studies expert (3mths/yr)		32	32	-	64
Other short term		32	-	32	64
1986 Evaluation				25	25
Subtotal	<u>644</u>	<u>316</u>	<u>434</u>	<u>367</u>	<u>1,761</u>
Research					
CIP Potato and Other research ^e		50	100	100	250
Participation impact studies		25	25		50
Subtotal		<u>75</u>	<u>125</u>	<u>100</u>	<u>300</u>
Contingency		100	100	100	300
TOTAL	<u>3,094</u>	<u>1,989</u>	<u>966</u>	<u>686</u>	<u>6,570</u>
Available funding					<u>5,915</u>
Deficit					655

Footnotes:

a Mission estimate

b Items ordered or procured locally. Includes (1) petroleum products (2) fertilizers and chemicals (3) vehicle maint. (4) housing rental (5) cattle

ANNEX C Continued

Footnotes continued

- b. (6) research, (7) administration, (8) locally procured equipment
- c. Two pick-up trucks and one seven - ton truck
- d. Assumes GRB will finance 50% in FY 1985 and 75% in 1986.
- e. Based on CIP/PROPAC proposal (Burundi portion)

Bibliography

- Bellon, W. François. "Mission de Consultation Semences au Burundi", FAO, Feb. 1983.
- Golla, Thomas P. Audit of Basic Food Crops Project, RIG/A/Nairobi, Feb. 1984.
- Grant, William and Ntunguka, Samson. "Enquête Agricole sur la Distribution du Elé Romany", OAR/Burundi, June 1982.
- GRB, IVème Plan Quinquennal de Développement Economique et Social du Burundi 1983-1987.
- GRB, Ministère de l'Agriculture et de l'Elevage, Projet des Cultures Vivrières en Haute Altitude, Juillet 1980.
- GRB, Ministère de l'Agriculture et de l'Elevage, Projet Cultures Villageoises en Haute Altitude, Rapports Annuels 1981, 1982, 1983.
- GRB, Ministère de l'Agriculture et de l'Elevage, Département de l'Agronomie, Projet de Multiplication et Diffusion des Semences Sélectionnées - Second Phase (1984-1989), Nov. 1983.
- GRB, Ministère à la Présidence Chargé du Plan, Projet Cultures Villageoises en Haute Altitude - Assistance Technique, Rapport Semestriel, Sept. 1983.
- , Mission d'Appui Rapport, Oct. 1983.
- Service des Semences Sélectionnées, In house report on Seed Production in Burundi, 1983.
- SOMEBU (Société Mixte des Etudes du Burundi) for GRB Ministère de l'Agriculture et de l'Elevage, Projet de Développement Rural de la Région Naturelle du Mugamba, 4 Vols., Nov. 1983.
- USAID, Basic Food Crops - Project Paper (Project No. 695-0101), Nov. 1979.

CONSULTANTS REPORTS ON BFC

- Ahmad, Dr. N., "Report of Aluminum Toxicity and the Karuzi State Farms", RONCO, Nov. 1982.
- Armstrong, Dr. Robert E., Trip Reports on Burundi, REDSO, 1983, 1984.
- Graetz, Dr. H.A.; Interim Farm Management Report, Apr. 1981.
- Hochlaf, Habib., "Investigation of Potential Transfer of Improved Seed Production to the Private Sector in Burundi", RONCO, July 1983.

Martin Cal. and Graham, James. Basic Food Crops Implementation Review,
REDSO, May 1983.

Weber, Fred R., "Soil Erosion and Drainage Plan", RONCO, May 1983.

Wilson, John. Construction Phase - Seed Processing Plant, June 1982.

Amplified Discussion of Kajondi Seed Crops

The original design of the Basic Food Crops Project emphasized the production of wheat and maize seeds "followed by peas, beans, sweet and Irish potatoes". As will be noted below, there has been a considerable reordering of emphasis as a result of agronomic conditions on the farm, availability of improved seeds, transport considerations and demand conditions on the part of farmers for the farm's products.

CROPSWHEAT

The only improved variety currently available for multiplication is Romany. Apparently it performs well and is much appreciated by farmers. Yield increases of better than 20 percent over traditional varieties have been reported, and it is hoped that once the seed processing plant is operational and Kajondi is capable of turning out a truly high quality seed, yield increments of more than 40 percent will be common.

It is however, impractical to rely on a single variety for several reasons. Both the Kajondi seed farm and highland farmers run the risk of losing their crop or a large part of it to an adapted plant pathogen. The longer the Romany variety is grown and the larger the area it occupies, the greater the risk.

Wheat seed is readily produced by farmers for their own use. They will therefore, not be obliged to purchase seed every year. As more farmers adopt the Romany variety, and farmer produced seed is either used at home, or purchased on local markets, the demand for the Kajondi farm's output

will decline to some level sufficient to periodically renew the supply.

For these reasons, ISABU must continue to develop new, and hopefully better, varieties of wheat for the country. Apparently one variety is ready and a second is being tested for 1700-2300 m. CIMMYT can help with a gene pool and breeding advice.

Last year ISABU was unable to supply the Kajondi farm with even 10 percent of the foundation seed for wheat requested. The farm may be obliged to undertake the production of its own foundation seed, further complicating farm operations and making additional demands on management and staff.

CORN (MAIZE)

Two varieties of corn are currently produced at the farm: Igarama 4 and Kitale.

Kitale is a long season (seven months), high yielding variety which does well in the high altitude zone and is appreciated by farmers. However, the growing season is so long that land sown in Kitale cannot be harvested and prepared in time for the second cropping season. For this reason, farmers sow both a traditional, shorter season variety for earlier harvest and food production, and only some Kitale for a later harvest, so as not to render too much of their land inactive in the second season and lower their food production. Obviously, this variety has a limited market. Also, the Kajondi farm is a bit low at 1900 meters for optimum production of Kitale.

Igarama 4 does well at Kajondi, but, is not appreciated by highland farmers, since it does not yield significantly more than traditional varieties. It has certain characteristics which render it less susceptible to certain pests (e.g. corn ear worm), but highland farmers are apparently not yet aware of this advantage.

The farmers of other regions of the country, notably the Bututsi where Kajondi is located, appreciate Igarama 4, and would be a good market for this crop. It performs better in the lower altitude zones, but the CVHA project does not have any operations there.

Dr. Bob Zeigler, an ISABU researcher financed by IDRC, is currently working on improving traditional corn lines from the high altitude zone, but indicates that high yield and long season are synonymous in corn. This means that farmers will have to be sensitized to other, less obvious virtues of new varieties of corn, such as resistance to insect pests or streak virus.

The market for corn seed, once suitable varieties have been found, will at least be a fairly constant market, since corn cross pollinates, and does not breed true to type, meaning farmers cannot readily produce their own seed.

IRISH POTATOES

ISABU, under the direction of Dr. Potts of the CIP Center in Peru, is currently testing a variety of potato which they hope will prove to be relatively disease resistant. Kajondi has 12 tons of seed potatoes of this variety which

will be planted in early April. Dr. Potts is doing several trials in experimental plots at Kajondi to determine optimum planting dates, performance of the new variety relative to Sangema, a known variety, and to evaluate the soil condition at the farm for its potential to produce high quality, disease free seed potatoes.

Potato production in Burundi is limited by soil fertility and three major pathogens: late blight, bacterial wilt and nematodes. Late blight is an air born pathogen which can be effectively treated by chemical agents. The other two pathogens, however, are soil born, and must be combatted by proper cultural practices and disease resistant varieties of potato. These pathogens can be introduced into a field by infected seed potatoes. Thus, the producer of seed potatoes bears a special responsibility to produce a high quality disease free product.

It is not yet known whether the soils at Kajondi are sufficiently disease free (the micro-organism responsible for bacterial wilt is widespread and adapts itself to many host plants) and fertile enough to permit production of high quality seed potatoes. Dr. Potts tested for nematodes and found none; the results of this coming season will give some indication of the situation with respect to bacterial wilt.

Seed potato production is thus a very demanding activity, requiring high quality inputs, careful soil management, diligent inspection of fields to remove diseased plants and the utmost caution at harvest time to ensure that the seed

potatoes produced are disease free and will not spread the ailment to unsuspecting farmers' fields.

As with all crops produced at Kajondi thus far, proper field roguing practices and quality control have not yet been put into effect. A complete system of soil management is also not yet fully developed. Knowledge of proper field practices and correct methods of determining the most effective moment of application of pesticides and fungicides may need refining also.

Along with the production problems of seed potatoes, come problems of handling, storage, and distribution. Potatoes are expected to yield 15 to 20 tons per hectare, and even 30 tons might be possible. Ten hectares of potatoes clearly present large on farm handling and storage requirements. Low cost methods of storage, on racks in a well ventilated shed with subdued light, is apparently effective for holding the crop a few months. Since the demand for seed potatoes is very high, and it is possible to plant in three different seasons of the year, it is expected that the crop will be distributed not long after harvest.

How this distribution will be accomplished is not known. None of those closest to the problem could provide a satisfactory answer to this question. If one hectare yields 20 tons of potatoes, and only ten hectares are planted to potatoes at Kajondi, even with three seven-ton trailers and two seven-ton trucks (the trailers are now at Kajondi, and CVHA should soon receive the trucks from FED) the magnitude of the distribution problem is obvious. It must also be remembered that Kajondi is not within the Mugamba, the CVHA area of operations, but instead lies some 30 kilometers to the south.

PEAS

This is a crop with good potential for the high altitude zone. A cool climate favors high yield, peas are less susceptible to disease or insect attack than beans, and the people of the region appreciate this food in their diet.

Trials are currently under way at the farm to evaluate the production potential of an available variety. The recommended variety, KYONDO, is a very old one, and is already well known in the target area. Peas like beans, have a low coefficient of multiplication, which means that a given quantity of seed will only produce about 10 to 15 times its own weight at harvest (as opposed to wheat which has a coefficient of multiplication of about 20 to 30, or corn, of about 70). This makes it difficult for farmers to save a sufficient quantity of seed for their own needs, especially since the addition to the diet provided by peas and beans is very much appreciated.

A new, higher yielding variety is needed if farmers are to realise any substantial benefit from CVHA extension of this crop, although there is also a need for increased production of Kyondo seed.

Peas require more hand labor than grains or potatoes. The climbing habit of the plant means that poles or trellises must be set for each plant in the field, which make machine operation for cultivation or spraying impractical. Hand harvest may also be necessary. Given the relatively low yield of this crop, this makes production quite expensive.

BEANS

Most agricultural experts are not optimistic about the possibility of producing beans at Kajondi. For a high yield, beans require much light and heat, and therefore do better in the lower altitudes. High humidity creates disease problems. Only in the bottomland, in the dry season, is there much hope of getting a decent bean crop at Kajondi.

SWEET POTATOES

Sweet potatoes are propagated by cuttings. These do not transport well, and for this reason, and because Kajondi is far from the area it is supposed to serve, sweet potatoe production has been abandoned.

ANNEX F: Partial Budgets - Kajondi Farm

Budget A - Variable costs involved in soil development of one hectare of land at Kajondi Farm.

Budget B - Breakdown of manure costs

Budget C - Potato Benefit Analysis

Budget D - Variable Costs for growing one hectare of wheat at Kajondi farm.

N.B. : Budgets A and D are limited to looking at variable costs when the farm is functioning under somewhat ideal conditions. Budgets B and C, however, use fixed and variable costs and are based on past farm practices, (often inefficient and inappropriate).

BUDGET A

Variable Costs Involved in Soil Development of One Hectare of Land at Kajondi Farm

The following is a summary of project variable costs incurred in soil development of one hectare of land at Kajondi Farm. Costs are calculated at 1984 prices, with the U.S. Dollar equal to 116 Fbu.

Although there are a multitude of soil development methods, in this first approach we are considering a basic buckwheat rotation over four cropping seasons, with inputs of lime, manure, and fertilizer. Cost projections are based on the same assumptions and information sources as used in our Variable Costs for Growing Wheat Study, of 28 March.

The rotation envisaged would include two seasons of planting and ploughing under the buckwheat. In the third season buckwheat seed would be harvested by combine and the chaff would be ploughed under. The grain lost in this process would reseed itself and this fourth crop would be eventually ploughed under to make way for the first season of production. Because buckwheat is harvested once and only planted twice the cost of seed hasn't been taken into account.

The following operations are used in this four season process:

- ploughing unbroken land
- disk harrowing twice
- liming 3 T/ha
- spreading manure 30T/ha once only.
- spreading fertilizer (45-45-30)
- planting
- ploughing under buckwheat
- disk harrowing once
- planting
- ploughing under
- disk harrowing
- fertilizing (45-45-30)

- planting
- harvesting
- ploughing under the chaff.
- disk harrow once
- volunteer buckwheat grows

Costs are broken down into two categories : direct inputs and mechanized and manual operations.

Mechanized and manual operations

Ploughing unbroken land

$$1518 \text{ fr/hr} \times 8 \text{ hrs} = 12,144 \times 1 = 12,144$$

Disking (twice)

$$1543 \text{ fr/hr} \times 2 \text{ hrs} \times 2 = 6,172 \times 2.5 = 15,430$$

Broadcast lime

$$1496 \text{ fr/hr} \times 1 \text{ hr} = 1,496 \times 1 = 1,496$$

Apply manure (30 T/ha)

$$21 \text{ M/D/ha} \times 90 \text{ fr} = 1,890 \times 1 = 1,890$$

Apply fertilizer (45.45.30)

$$1496 \times 1 \text{ hr} = 1,496 \times 2 = 2,992$$

Ploughing broken land

$$1518 \text{ fr/hr} \times 4 \text{ hr} = 6072 \times 3 = 18,216$$

Planting

$$2238 \text{ fr/hr} \times 2 \text{ hr} = 4476 \times 3 = 13,428$$

Harvesting

$$2914 \text{ fr/hr} \times 1.5 \text{ hr} = 4371 \times 1 = 4,371$$

Transporting to storage (tractor and trailer)

$$1594 \text{ fr/hr} \times 1.5 \text{ hr} = 2391 \times 1 = 2,391$$

Sub Total	72,358
-----------	--------

Inputs

Lime 3T/ha in 2 years 33,000x1 = 33,000

Fertilizer Urea (46%N)

100 kg x 52 fr. = 5,200

STP (46%)

100 kg x 57 fr = 5,700

KCl (60%)

50 kg x 44 fr = 2,200

13,100 13,100 x 2 26,200

Manure 30 T x 1200 fr 36,000 x 1 36,000

Sub Total 95,200

Total 167,558 Fbu

Philip Christensen

3 April 1984

C. Breakdown of manure costs

A. Cost Forage Crops

average weight gain of 270kg

average weight gain of 2kg/head/month

A.1 Cost Per hectare of Forage (Harvested) Crops

	270kg	540	Francs
1. Manure 20T/year x 2292 frs.	2,316		45,840
2. Lime 3T/4 years x 11,000fr/T			8,250
D. <u>Over 13. cc Ploughing</u> 11,845 fr/ha ÷ 4 years			2,961
4. Disking 2 x 14,664 fr/ha ÷ 4 years			3,666
5. Chemical fertilizer 4(45 : 45 : 30) 37			49,000
6. Labour 250M/D x 90 fr.			22,500
7. Transportation of tripsacum = 60lit x 70 fr.			4,200
			<u>136,417 fr.</u>

E. Cost per hectare of pasture

1. Manure 20T/yr ÷ 4 years x 2292 fr.		11,460
2. Lime 3T/yr ÷ 4 years x 11,000 fr.		8,250
3. Ploughing 11,845 fr/ha ÷ 4 years	1,860	2,961
4. Disking 2 x 14,664 fr/ha ÷ 4 years		3,666
5. Chemical fertilizer 4(45 : 45 : 30) 37		49,000
6. Labour 50 M/D x 90 fr.		4,500
		<u>79,837 fr.</u>

B. Cost per Head of Cattle

1. Herders		1,219
2. Feed supplements		1,694
3. Salt blocks and veterinary costs		249
4. 1 ha. forage crops = 136,417 frs. at 5 head per/ha		27,283
5. 1 ha. pasturage = 79,837 frs. at 2 head per ha.		39,918
6. Cattle stable built at 200,000 fr. and depreciated over 25 years at 50 head per stable		160

Subtotal 70,523

7. Assistant agriculturalist (veterinary)

salary = 196,500 frs./yr.

- at 50 head 3,930 frs.

- at 250 head 786 frs.

Total at 50 head

74,453 frs.

Total at 250 head

71,309 frs.

C. Income per head of cattle

Bought at 72 fr/kg average weight of 270kg
 Sold at 74 fr/kg average weight gain of 2kg/head/month
 Gross profit 24 kg/yr x 74 fr. = 1,776
 270kg x 2 fr. = 540
 2,316

D. Overall cost per head of cattle

a) with 50 head of cattle
 74453 - 2316 = 72,137
 b) with 250 head of cattle
 71309 - 2316 = 68,993

E. Cost per metric ton of manure produced

1 head of cattle produces 3.3 T manure/yr
 a) with 50 head of cattle
 1 ton manure costs 21,860
 b) with 250 head of cattle
 1 ton manure costs 20,907

... potatoes, while prices average 50 fr/kg in the area of...
 ... prices in Bugumuro average 50 fr/kg with seasonal fluctuations...
 ... fr/kg. The project paper proposes seed and ware potato prices of 20...
 ... francs respectively. Selling seed potatoes at a price below...
 ... net value encourages speculation and discourages farmers from growing...
 ... potatoes

... have calculated potential... in function of three possible seed...
 ... prices : 25, 30, and 35 francs. ... potatoes would be sold five...
 ... more cheaper than the seed potatoes. ... overall cost-benefit analysis...

... Table III shows income generated in function of five possible yields...
 ... these three possible sales prices.

Cost of seed potato production

In order to properly assess the... of producing potatoes we have...
 ... (shown) the costs to include all the... essential to running the...

Potato Benefit Analysis : Basic Food Crops

This report details the income which can be generated and the costs incurred by the production of seed potatoes at the Kajondi farm. The report is presented in three parts : income, costs, and benefits.

A. Income generated by potato production

The income generated is calculated in function of the proportion of seed potato produced, the yields per hectare, and the prices received on seed and ware potato sales.

We assume that 75 percent of the yield will be high quality seed potato, and 25 percent will be sold as ware potatoes. Of the seed potatoes produced three tons per hectare will be retained for replanting.

The yield depends upon the productivity of the foundation seed, the eventual decisions concerning fertilizer applications, and the agronomic skills of the farm managers.

Potato producers along the Zaire-Nile crest receive, on the average, 27fr/kg for their potatoes, while prices average 34fr/kg in the area around the farm. Consumer prices in Bujumbura average 50frs/kg with seasonal fluctuations as high as 70frs/kg. The project paper proposes seed and ware potato prices of 20 and 15 francs respectively. Selling seed potatoes at a price below their market value encourages speculation and discourages farmers from producing their own potatoes.

We have calculated potential potato revenue in function of three possible seed potato prices : 25, 30, and 35 francs. The ware potatoes would be sold five francs cheaper than the seed potatoes. The overall cost-benefit analysis chart (Table III) shows income generated in function of five possible yields and these three possible sales prices.

B. Cost of seed potato production

In order to properly assess the costs of producing potatoes we have calculated the costs to include all the expenses essential to running the

farm, which will be incurred by the Burundi government on a long term basis. Thus we have included the depreciation of all machinery, vehicles and the buildings which are considered essential to potato production.

Where possible we have integrated general expenses into particular operations so as to arrive at a per hectare cost. For example, the hourly cost of running a tractor (2,307 francs) includes part of the depreciation and maintenance costs of the garage, part of the salaries for the mechanics, the tractor operators and their respective assistants, part of the running costs of one supervisory vehicle, as well as spare parts, fuel, lubricants and depreciation for the tractors.

Some costs such as sorting, grading and potato transportation are calculated in terms of the per hectare yield. Certain expenses, such as running costs for three utility vehicles and administrative salaries, which are incurred indiscriminately by all of the seed crops, are shared in a proportion equal to the acreage expected to be planted for each crop. We have assumed, that of the area planted in maize, wheat, and potatoes, 29 percent will be planted in potatoes.

Since the farm is still in a developmental stage and the farm plans have not yet jelled it is necessary to make certain assumptions in order to calculate the costs. The following assumptions have been made in the cost calculations:

- plant 3 tons per hectare
- plant 30-66 hectares in potatoes annually
- potatoes occupy 29 percent of the land planted in seed crops
- 6 tractors, 2 trucks, and 4 utility vehicles will meet the farm's needs
- one hectare forage crops per five head of cattle
- one hectare pasturage per two head of cattle
- potatoes sold will not be transported beyond a radius of 100km.
- tractor life of 8,000 hours (1600 hours annually)

- truck and utility vehicle life of 70,000 km. (14,000 km annually)
- farm implements life of 10 years
- building life of 25-30 years
- 600 tons of manure per year are available for purchase.

Table 1 gives a complete breakdown of costs. The present farm plans include an annual application of thirty tons of manure per hectare. At this rate of application the cost of manure production exceeds all other combined costs. To facilitate management decisions we have calculated several possible manure costs in function of the rate of application and the source of procurement of the manure. Our manure production costs are ten times higher than the cost of buying manure from neighboring projects, but the annual supply is limited to 600 tons. The cost-benefit chart (Table III) shows the production costs on a sliding scale in terms of five possible yields per hectare and in terms of two of the possible decisions on manure application and the source of procurement.

TABLE 1 Cost Breakdown

(per hectare)

	<u>Francs</u>
1. Ploughing (5 hours/ha)	11,865
2. Disking (3 hours/ha x 2)	14,688
3. Green manure	
- ploughing, disking, planting, fertilizer, ploughing under or harvest	68,475
4. Chemical fertilizer	
- 200kg urea 46%	
- 300kg 18.46.0	
- 300kg KCl 60%	42,600
5. Lime	11,000
6. Potato seed	102,345

7. Planting, manure and fertilizer application (100 M/D)	9,000
8. Maintenance (weeding, roguing, pesticide application)	44,310
9. Ridging	14,470
10. Pesticides	17,450
11. Removal of haulms	12,600
12. Harvest	18,840
13. Sorting and grading 369 frs./ per ton	
14. Stockage and marketing (transportation) 3771fr/ton	
15. Salary for agronome responsible for tuber production (30 ha minimum)	5,000
16. Administrative salaries and vehicles. (29 percent and 30 ha/minimum)	35,347
Subtotal	407,990

- 17. Manure 50 cattle 21,860fr/T manure
- 250 cattle 20,907fr/T manure

C. Potato production benefits

Our first objective, is to find the combination of yields, prices, and decisions necessary for a cost beneficial operation. The unknown element in this equation is the minimum manure dosage which will allow us to maintain a profitable yield. ISABU, the government research station, has recorded yields of 30 to 40 tons per hectare following the recommended dosage of manure. It remains to be seen what the soils of Kajondi can produce with quality seed. It would be reasonable to expect yields of 25-30 tons but we need to establish the minimum manure dosage necessary to maintain this yield. If the green manure and chemical fertilizers are supplying sufficient soil nutrients to reduce manure applications, potato production can be cost beneficial. Present sales prices however, will not permit a profitable potato production. Table II synthesizes how potato prices and management decisions concerning manure

applications affect the yield per hectare required to break-even. It also illustrates how these decisions limit the total number of hectares of cropland that we can manure annually.

As Table II shows, at 25frs. per kg and a zero manure dosage, we would need a yield of 21 tons per ha in order to break-even. In another example (applying 10 tons manure per hectare and keeping 50 cattle), at a price of 25 francs we need a yield of 25 tons and at 35 francs we need a yield of 16 tons. This inversely proportional relationship between price and yield is characteristic of the chart. Increased manure applications and herd size also accentuate the yield requirements for a profitable operation. A price of 30fr/kg for seed potatoes will allow a much needed flexibility in decision making.

TABLE II
YIELDS REQUIRED TO BREAK-EVEN : PRICE VS MANURE DECISIONS

	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀
MAXIMUM AREA THAT CAN BE MANURED (HA)	0	60	76	51	38	30	25	142	95	71
25fr/kg	21T	23T	25T	26T	28T	30T	31T	28T	31T	35T
30fr/kg	17T	18T	20T	21T	22T	24T	25T	22T	25T	28T
35fr/kg	14T	15T	16T	18T	19T	20T	21T	19T	21T	23T

DECISIONS:

- D₁ : no manure applications
- D₂ : apply 10 T manure/ha, keep 50 cattle, buy 600 T manure
- D₃ : apply 10 T manure/ha, keep 50 cattle, buy 600 T manure
- D₄ : apply 15 T manure/ha, keep 50 cattle, buy 600 T manure
- D₅ : apply 20 T manure/ha, keep 50 cattle, buy 600 T manure
- D₆ : apply 25 T manure/ha, keep 50 cattle, buy 600 T manure
- D₇ : apply 30 T manure/ha, keep 50 cattle, buy 600 T manure
- D₈ : apply 10 T manure/ha, keep 250 cattle, buy 600 T manure
- D₉ : apply 15 T manure/ha, keep 250 cattle, buy 600 T manure
- D₁₀ : apply 20 T manure/ha, keep 250 cattle, buy 600 T manure

A second objective is to be able to generate sufficient profits to partially compensate for other seed crops which may be grown at a loss. There are strong possibilities that this can be done as potatoes are a potentially high yielding crop. But high quality seed potatoes must be planted at Kajondi to test the soil responsiveness.

Conclusion

Seed potato production appears to be cost beneficial not only on a short term profit-and-loss basis but also on a long term basis, where all recurrent costs are considered.

Certain steps need to be taken before planting potatoes on a large scale :

- seed potato sales prices must be renegotiated with F.E.D. and ware potatoes must be commercialized in a more businesslike manner
- several hectares should be planted in quality seed potato in order to test the Kajondi soil and its responsiveness to chemical fertilizers and green manure, as well as the productivity of the potato variety.

A study of this nature is only useful if it can be compared to cost-benefit figures for the other seed crops grown on the farm. Therefore, it is essential to analyse the cost-benefit aspects of maize and wheat. The results would put this analysis into perspective.

TABLE III

COST BENEFIT ANALYSIS PER HECTARE

YIELD	PRICE	REVENUE	COST _A (only buying manure)	BENEFIT _A	COST _B (applying 30T manure and keeping 50 cows)	BENEFIT _B
15 T/HA	25frs.	356,250	473,250	-	667,670	-
20 T/HA	"	450,000	514,650	-	688,370	-
25 T/HA	"	593,750	535,350	58,400	709,070	-
30 T/HA	"	712,500	556,050	156,450	729,770	-
35 T/HA	"	831,250	576,755	254,495	750,470	80,780
15 T/HA	30frs.	431,250	473,250	-	667,670	-
20 T/HA	"	575,000	514,650	60,350	688,370	-
25 T/HA	"	718,750	535,350	183,400	709,070	9,680
30 T/HA	"	862,500	556,050	306,450	729,770	132,730
35 T/HA	"	1,006,250	576,755	429,495	750,470	255,780
15 T/HA	35frs.	506,250	473,250	33,000	667,670	-
20 T/HA	"	675,000	514,650	160,350	688,670	-
25 T/HA	"	843,750	535,350	308,400	709,070	134,680
30 T/HA	"	1,012,500	556,050	456,450	729,770	282,730
35 T/HA	"	1,181,250	576,755	604,495	750,470	430,780

Variable Costs for Growing
One Hectare of Wheat at

Kajondi Farm

The following is a summary of projected variable costs incurred in the production of seed wheat at Kajondi farm. Costs are calculated at 1984 prices, with the U.S. dollar equal to 116 Burundi francs.

The costs are broken down into three categories, mechanized operations, manual operations, and direct inputs. Costs do not reflect the cost of soil development (i.e. green manure rotations or possible applications of organic manure), nor do they address the cost of seed treatment after the wheat arrives at the as yet uncompleted seed processing building. Cost projections are based on efficient farm management procedures. It is assumed that machinery is running efficiently and that a tractor drawn combine harvester is on board. Tractor costs reflect fuel, lubricant, and maintenance costs as well as the salaries of mechanics and drivers, while machinery costs reflect only maintenance expenses.

Manual labour is limited to herbicide applications. Herbicide applications are based on the requirements of the 1983 wheat season. Fertilizer and lime doses are based on Dr. N. Ahmad's report. Mechanized operation times are averages based on dealer's specifications and the estimates of farm personnel.

Mechanized costs

1.	Ploughing	
	1518 fr/hr at 4 hr per ha	6072 FBu
2.	Disking	
	1543 fr/hr at 2 hr per ha	3086
3.	Broadcasting urea	
	1496 fr/hr at 2 applications	2992
	Broadcasting lime	
	1496 fr/hr at 1 hr per ha and 6 crops per application	249
4.	Planting	
	2239 fr/hr at 2 hr per ha.	4476
5.	Harvesting:	
	Combine	
	2914 fr/hr at 1.5 hr per ha	4371
	Hauling grain	
	1594 fr/hr at 1.5 hr per ha	2391
	Sub Total	23,637

Labour Costs

Herbicide application 3.5 M.D. x 90 fr 315

Direct Inputs

1. Lime	
3T/ha every 6 crops	5500
2. Fertilizer	
Urea - 350 kg at 46 fr = 14,490	
STP - 250 kg at 52 fr = 11,500	
KCl - 150 kg at 44 fr = 6,600	
	32,590
3. Seed 100kg/ha at 40. fr	4,000
4. Herbicide	
3.6 lt at 403 fr	1,451
Subtotal	43,541
Total	67,493 FBu

Revenue at 2T/ha x 30 FBu/kg = 60,000 FBu

Philip Christensen

28 March 1984

Quality and Price Considerations

The importance of two aspects of the product of Kajondi farm, the quality of the product, and its price, deserve special mention.

Quality

The basic premise of the BFC project from the beginning has been that it would provide a high quality, relatively low cost input to highland farmers. Every effort must be made to ensure that the farm's products are of the highest quality possible because:

1. Only thus will farmers derive the greatest possible benefit from the project;
2. Extension work will proceed more rapidly and be more favorably received if farmers can
 - a. see a visible difference in the quality of Kajondi seed (i.e. uniform size, clean, no broken or damaged grains, no weed seeds),
 - b. see a visible improvement in their yield, and in the vigor of their crop, and
 - c. come to associate these qualities with the extension project, and the Kajondi farm name.
3. Low quality seed potatoes can actually do more harm than good, and cause farmers serious problems by introducing bacterial wilt or nematodes into their fields. Any low quality seed harms the farmer if it reduces the return to his land and labor that he would have otherwise received.
4. A truly superior product will soon be recognized as such, and people will be willing to pay a premium price for it (see below).

5. If seed is treated with potentially lethal chemicals, it must be dyed to protect unwitting or secondary customers from consuming it. Knowledge of the meaning of the dye might be expected to spread rapidly, but some experts feel that it is better to not treat seed with a persistent hazardous product at all, since inevitably some treated seed will be consumed.

Price

The existing practice among all seed producing organizations in Burundi is to sell their products at the market price for food grain or eating potatoes, etc. This is the practice because:

- a. Farmers are "unwilling" to pay more;
- b. The seed is an input to subsistence agriculture, and consequently does not generate any revenue for the farmer; and
- c. Farmers are just beginning to learn about "improved seed", and do not yet appreciate its value.

These claims are probably all true. At this point in Burundi's agricultural development, a subsidized seed industry is essential. One might regard the practice of selling seed for a price below its production cost as an advertising or a marketing cost, which should both provide a service to farm communities and, in the long run, establish a market for a very saleable product, and thereby stimulate a source of supply.

There are several important consequences of this practice:

- (i) One can never be sure whether farmers are purchasing seed for food or for sowing. To eat improved seed is a relatively poor use of a scarce and valuable national resource.

(ii) Seed production cannot be a profitable business, since seed production involves numerous costs not borne by food crop producers. The most immediate consequence of this is that the private sector will not be interested in investing in seed production. At present in Burundi this is probably a good thing, since no mechanism exists for controlling the quality of seed put on the market.

(iii) The GRB subsidy to seed producers has a lower economic return than it should, since the benefit from improved seed is only derived if it is planted, not if it is eaten.

For these reasons, it is in the best interest of the nation that seed begin to receive a premium price as soon as possible. This is a strong argument for concentrating on high quality in all seed multiplication centers. Farmers will notice and appreciate a truly superior seed. Simple marketing practices also should be encouraged, such as special, easily recognized bags with an emblem identifying the origin of the seed as e.g. Kajondi Farm. Recognition of and demand for quality seed is the mechanism which will lead to acceptance of a premium price.

If agriculture in the Mugamba were to become truly commercialized then the demand for seed would be derived from the demand for the food crop for which it is an essential input. However, given the subsistence nature of farming in the Mugamba, this mechanism will be slow to develop.

The flour mill at Muramvya is the only market for wheat and corn currently capable of stimulating any substantial increase in commercial production. Price policy at the mill with regard to locally produced grain has yet to be determined.

The CIF price of imported wheat at the mill is apparently often lower than local market prices. If the mill is to play a role in stimulating commercialization of agriculture in the Mugamba (and thereby stimulating a demand and a willingness to pay for Kajondi seed), an incentive price for local producers will have to be instituted.

ANNEX H

Summary History of Basic Food Crops Project

(OAR/Burundi)

Background

The PID was approved in Washington in September 21, 1977. Due to a change in the project recommended by the PID, Dr. James Delouche of the Seed Technology Laboratory, Mississippi State University, was fielded to Burundi in April - May 1978 for reconnaissance and review to determine if the limited role for USAID might be considered feasible - this report stated that PID needed to be rewritten to something more logical and implementable.

In June 14, 1978, upon a request from GRB to USAID for USAID to provide assistance to the Burundi Agricultural sector, AID responded positively and the following steps were taken to insure a successful cooperation. AID request brought in Dr. Delouche, of the Mississippi State University to undertake a sector assessment between February 26 and March 16 1979. One major problem during the sector assessment study was to find suitable agricultural field for the seed multiplication farm. Four sites were suggested by GRB in the course of the study.

The four sites were Mayuyu, Kajondi , Vyuya and Muhweza.

A visit to the respective sites were made by the assessment team with GRB officials. The following criteria were necessary prior to the qualification

1. the area should be at least 200 ha
2. good enough soil quality
3. topographic relief allowing mecanisation
4. be near the intended seed extension area
5. not too far from Bujumbura to permit a quicker logistic support and enable the expatriates to operate within a distance near their home and family in Bujumbura.

After the visit USAID impressions and conclusions were as follows :

For Mayuyu - did not fulfil conditions 1 and 3 and the region was so overpopulated there would be expropriation problems.

For Vyuya - did not comply with condition 2, the land was not cultivated.

For Muhweza - absolutely negative for the criteria 2, the soil was too acid, may be due to lack of drainage.

For Kajondi - it was the only place complying with the criteria 1,2 and 3 - but did not fulfil 4 and 5. It was retained.

After a considerable correspondence and assurances from the AAO/Bujumbura at that time, a design team was sent to prepare a PP in April 1979. Team members from Mississippi State University were Dr. James Delouche, Dr. Tony Lyons, David Nelson, Eugene Webb and from AFR/DR Joe Carroll and Win Fugglie the head of Mission.

AID/W delegates authority to Ambassador and his designee to execute Project Grant Agreement on February 13 1980 (STATE 039270) AID Mission undertakes all necessary action and a Proag is negotiated between AID and GRB - On April 3, 1980 the Proag is signed, obligating \$2,000,000. On March 18, 1981 the first coordination meeting was held between Ministry of Plan, USAID and FED to discuss the format for the CVHA extension project to be funded by FED.

Project History

April 3 1980 - December 31 1980

Personnel and Technical Assistance

Immediately following the signing of the Proag GRB assigned SIBONIYO Fabien Agronomist to supervise work at the farm. He would eventually become head of the roots and tubers section. He arrived April 15 and was housed at the Rwira Farm (Project Bututsi) across the Marais from Kajondi. SINZINKAYO Pascal was assigned farm manager on November 18, and was housed at Mahwa, 25 km away. On December 4, BANYANKIYE Pegase was assigned to the farm as head of the cereals section. He also was housed at Mahwa. Tony Salema TDY construction adviser arrived in October 1980 for four months.

Crop Activities

There are two major planting seasons in Burundi March-April for wheat and potatoes and October-November for corn and potatoes. Since the project began in early April a strong effort was made by GRB to get a green manure crop in before the end of the rainy season. On April 16, the first tractors arrived at Kajondi, rented from the Office National de la Mecanisation Agricole (ONAMA) and began ploughing the fields. 20 hectares were prepared and planted in Buckwheat by late May. An additional 100 hectares were ploughed but were not disked nor prepared for planting. In October of 1980 20 hectares of Kitale corn were planted where the buckwheat had been ploughed in.

Construction

With the arrival of Tony Salema, Ministry of Works (MOW) decided it would be unable to complete the plans, technical specifications, bills of quantity (BOQ) and the invitation for Bid (IFB) Documents for the farm buildings. They decided to award the contract for the design to a private firm. Design and elaboration of the BOQ for the houses was to be done by Jean Daniel Letchti, technical adviser at the MOW. Seed Processing building (SPB) to be designed by a Kenyan firm.

Procurement

Project Implementation Order Commodities numbers PIO/C 00004 (2 vehicles) 00005, (2 fuel storage tanks), 00006 (Major farm equipment purchase from U.S.), 00008 (local purchase appliances), 00014 (2 pick-up trucks) and 00016 (Suzuki motorcycle) issued in November of 1980. First vehicle was received on December 9, 1980.

General

Amendment 1 to Proag signed on December 30, 1989 increasing funding to \$2,700,000.

January 1 1981 - December 31 1981

Personnel and Technical Assistance

On January 16 1981 Dr. Graetz arrived for a 3 month TDY as interim farm manager. He was to put together an interim farm plan and assist AID in developing its agricultural policy for the farm. On February 12 the earmarking documents were issued for the long term advisors and short term consultants. On March 24 NIYUNGEKO Novat was named Project Coordinator for the Basic Food Crops Project coordinating USAID and FED inputs. On April 1 1981 Johnny Ernotte joined the project for two years as the mechanical advisor. On April 12 Dr. Graetz departed leaving behind his report. On September 30 contract signed with RONCO for principal advisor and short term consultants.

Crop Activities

In early April, 5 ha of Romany wheat were planted by hand. A wheat sower had been rented from the Ferme de Randa but it was nonfunctional. In addition buckwheat, sweet potatoes, yellow lupin, blue lupin and soja were planted on 25 ha. In May, 10 of the 20 ha of Kitale corn were harvested with a yield of 950 kg/ha and the other 10 ha were ploughed back in as yield was too poor. Seed was poor quality, not to be distributed to farmers.

In August the 5 ha of wheat were harvested and threshed by hand, giving a yield of 2 MT/ha. 7 ha of Kitale corn were sown in October-November along with 6.5 ha buckwheat, 1.25 ha Irish potatoes, 3.75 ha beans and 1.75 ha of lupin.

Construction

GRB awarded contract for design of Farm Building to Kananura Melvin on January 9, 1981. IFB was ready by July 1981 and bids were received from the prequalified companies, SOGETRABU, COMIBURUNDI and LAGECO on August 20. Following the granting of a waiver from AID/Washington to waive the Commerce Business Daily advertising requirements for the construction, the contract was awarded to the lowest bidder, Comiburundi, on November 7 1981. On December 24, Comiburundi received their advance and work actually began.

On December 29 AID issued Project Implementation Order/technicians (PIO/T) for the design of the Seed Processing Building (SPB).

Procurement

In January 1981 Project issued PIO/C 00015 for a Mercedes truck and in April issued PIO/C 00024 for 2 generators. In August Pio/c 00030 was issued for purchase of seed processing equipment and PIO/C 00031 for the purchase of 55 tons of fertilizer.

In January and April Project received 2 pickups (00014) and in August received the Mercedes (00015). The 55 tons of fertilizer were received in December 1981. The two generators were received in October 1981. Suzuki was received 29 April 1981.

General

On March 18 1981 Ministry of Plan held their first coordination meeting with USAID and FED for establishment of Cultures Villageoises en Haute Altitude (CVHA). In mid March Mission conducted its first in house implementation review. Amendment No. 2 to the Proag was signed on November 20 1981 increasing U.S. Funding to \$4,120,000.

January 1 1982 - December 31 1982

Personnel and Technical Assistance

John McAlister, team leader and agronomist, arrived January 2 1982. William Grant, administrative advisor, arrived in country March 27. John Wilson arrived for short TDY to inspect seed processing building site in June therefore continuing onto Nairobi to meet with TRIAD (Architectural and Engineering firm). Nazeer Ahmed arrived in Burundi on July 7 for 30 days for Aluminum Toxicity Consultancy (Report received November 8, 1982 entitled Report of Aluminum Toxicity and the Karuzi State Farms). In July Kadagaza Melance was hired and named head of the Mechanical section at the farm.

Crop Activities

March 1982 the 1.25 ha of potatoes were harvested yielding over 14MT/ha. Quality of the seed potatoes was poor with high factor of bacterial wilt. Crop was sold for consumption.

In mid April, 10 ha of Romany wheat were planted by wheat drill in addition to 13.5 ha of buckwheat.

In May the 7 ha of Kitale were harvested with a yield of 960 kg/ha. September harvest of Romany yielded 20 MT, or 2MT/ha. Harvest was done with sickle bar mowers and new threshers. Threshers proved inadequate for farm use. October-November farm planted 15 ha of Igarama 4 corn, a hectare wheat trial and 40 ha of buckwheat and beans.

Construction

Construction (by Comiburundi) proceeded slowly. McAlister's modified design of their house so it started late. Comiburundi showed their weakness in finish work. Majority of construction supervision carried out by Bizimana Joseph (GRB supervisory engineer), Pushkar Brahmhatt (REDSO/ESA Pham Van Vinh (AID/Kigali) and William Grant.

In April a contract was signed with TRIAD in Nairobi for design of seed processing building (SPB) John Wilson provided technical specifications. IFB and final plans submitted in November. RLA Paul Scott (REDSO/ESA) did approve administrative and contractual clauses of IFB and they were redrafted during the end of 1982. International prequalification process begins in December.

Procurement

During January-April 1982 the majority of the farm equipment ordered under PIO/C 00006 arrived (tractors, farm equipment, tools and furniture). First load of seed processing equipment arrived in August. PIO/C 10016 for Toyota Hilux issued on January 9, 1982 and vehicle received on March 15. Toyota Scout received on April 1, 1984. 40 tons of fertilizer order under PIO/C 10018 on February 2, 1982 and received April 26 1982. Two fuel tanks (PIO/C 00005) officially received at Kajondi on September 15, 1982. 2 - 2way radios ordered in PIO/C 20006 in November 1982.

Participants

On May 25 Niyungeko Novat departed for 10 week participant training course on seed improvement at Mississippi State University (MSU) and on a 2 week observation tour at CIMMYT in Mexico. On June 22 Banyankiye Pegase departed for the U.S. to get his B.S. at MSU, beginning January 1983 following a 6 month language training course in Washington.

General

In March 1982 the Farm sold 7 tons of Romany wheat to the Service des Semences Selectionnées (SSS) for distribution to local farmers. 4.5 tons actually sold to farmers, the rest went to the flour mill. In-house evaluation by REDSO/ESA personnel carried out in late February/March. Evaluation report submitted April. Following coordination meetings through early May, GRB and FED signed their grant agreement in May of 1982. In September of 1982 450 kg of Kitale seed were distributed by SSS in the Mugamba region. In July and August William Grant and Samson Ntunguka prepared a questionnaire on use and cultivation of wheat by small farmers in the project zone (Mugamba), and surveyed over 100 farmers. Report summarizing findings was submitted the end of September. Amendment No. 3 to the Proag signed on August 30 1982 increasing funding to \$5,458,000.

1983

Personnel and Technical Assistance

On March 31 Johnny Ernotte terminated his two year contract. He was replaced in late May by J. Henry Cyr, on contract with RONCO. End of April Fred Weber (RONCO) arrived for a one month consultancy on soil erosion (only spent 2 weeks in Burundi). His report entitled "Soil Erosion and Drainage Plan" received in June 1983. Habib Hochlaf arrived in Burundi on May 5 for a 3 month consultancy to study the possibilities of transferring seed production to private farmers (Report received in August entitled "Investigation of Potential Transfer of Improved Seed Production to the Private Sector in Burundi). On August 22 Sinzinkayo Pascal was transferred out of the Project to the Ministry of Agriculture. Siboniyo Fabien was named interim farm manager and took over the functions on August 23. In November, Louis Iraguha was named as an agronomist to Kajondi. On December 14, Ndayishimiye Vital was named Farm Manager and Siboniyo Fabien was transferred, effective January 1, 1984, off the farm. John McAlister left Burundi on December 18. (Final report received on March 20).

Crop Activities

In early February a severe hail storm damaged buckwheat crop (95% loss) and damaged corn crop. In March-April 46 hectares of wheat were sown. In May 33 MT of corn were harvested (shelled in July -August). In August the combine harvester belonging to the Ferme de Randa was sub-leased from the brewery to combine harvest part of and thresh all of the 46 ha of wheat. Yield was 1MT/ha, 65 ha of buckwheat harvested for yield of 10.5MT. In early October 23 ha of Igarama 4 and Kitale corn were planted 17 and 6 respectively.

Construction

In early January first type B house was provisionally accepted and occupied at Kajondi. In March the fertilizer shed, 1/2 of garage, and seven houses and dormitories were provisionally accepted. On April 8 official provisional acceptance made by GRB Adjudication Committee. REDSO/ESA engineer Lou Bronkowski was principal AID advisor on acceptance committee. Final acceptance scheduled for mid April 1984.

On March 15 the approved, revised IFB for the seed processing building was issued to three prequalified companies and only one offer was received on April 19, from Comiburundi. This offer was much higher than the budgeted amount. In May USAID requested permission to negotiate with other companies for a more suitable price. Permission was received in July and August from GRB and AID/W respectively. In September, before negotiations could be started R. Armstrong REDSO/ESA agronomist inspected plans, determined they were overdesigned and should be redone before any negotiations started. SPB plans were sent back to TRIAD in Nairobi for revision and returned to Burundi in early January 1984.

Procurement

In March project purchased their fertilizer requirements from the FAO fertilizer project totalizing 51 tons. Subsequent PIO/C 20028 was issued to purchase additional 79 tons from FAO project. At the end of October a contract was issued to Transagro in Germany to supply 572 metric tons of fertilizer. On February 2, the letter ordering 755 tons of crushed limestone was issued by the Ministry of Finance. First shipments had already been received in late December, early January. Remaining seed processing equipment arrived in May 1983, and remaining farm equipment (parts, corn sheller) arrived in June 1983. Two 2-way radios received July 22 and the first replacement vehicle was purchased and received in July 1983. PIO/C for replacement equipment and spare parts issued in July to AEGIS. Request for Quotations issued in November for spare parts for vehicles.

Participants

Siboniyo Fabien left for Nigeria on May 9 to attend Root Crops course at IITA, returning July 15. Pascal Sinzinkayo was to attend seed improvement seminar at MSU but was unable to meet English requirements. Niyungeko Novat attended Department of Agriculture course on the Application and Diffusion of Agricultural Research at the Community Level at Iowa State University from August 22 to October 1 1983.

General

FED and GRB signed technical assistance contract with AGRAR/SOMEBU in January and first 3 technicians in place before end of January. 17 tons of Romany wheat distributed by the newly created FED - CVHA extension service. In March, ADO Hal Fisher leaves, end of May Cal Martin and Jim Graham perform implementation review of project.

In July new ADO, Stan Wills, arrives. In September CVHA distributes 7MT of Igarama 4 seed and Provincial Agronome in Bururi distributes 1.5 MT. Amendment No. 4 to the Proag was signed on August 23, 1983 increasing the funding of the project to \$5,915,000 and GRB funding to \$3,431,030. It also extended the project completion date to September 30 1986 and approved the revised Annex 1 to the Proag.

1984

Personnel and Technicians

GRB names two more agronomists to Kajondi bringing total to four plus the farm manager. Peace Corps Volunteer Suzanne Poland spends 2 weeks at Kajondi helping develop a farm plan in February.

Crop Activities

In late February farm received 12 MT of Irish potatoes variety Sangema, from ISABU - CIP. Planted in mid April. 52 hectares of wheat planned in late March mid April.

Procurement

Supply contract for two threshers from India issued in early January, machines arrived in Burundi in late March. Second replacement vehicle received in early January. Offers for farm equipment received in early January. Evaluated and permission to issue purchase orders given to AEGIS. Quotations for spare parts evaluated and purchase orders issued to Toyota and SACOM (African Air Freight). Parts received in January and February. On March 31, Brazilian made combine harvester ordered. First 255 tons of fertilizer received in March from Transagro.

Construction

IFB issued for Seed Processing Building late February. Offers received from four companies on March 26. Evaluation of offers currently under way.

General

CVHA distributed 40MT of Romany wheat seed to local farmers in February March. First in depth evaluation begins March 14 with the arrival of John Blumgart and Greg Kruse, R. McColaugh from REDSO/ESA arriving March 20 and R. Adams (engineer from REDSO/ESA) arriving March 26.