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**A CONTRIBUTION TO THE DEVELOPMENT OF A  
MEDIUM-TERM USAID DEVELOPMENT ASSISTANCE  
INVESTMENT STRATEGY FOR BURUNDI**

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**FINAL REPORT**

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## **PREFACE**

This report was researched and written by consultants from Ithaca International Limited of Ithaca, New York. The work was performed under a contractual agreement with the University of Arkansas and funded by the United States Agency for International Development Mission in Bujumbura, Burundi [Contract No. AFR-0106-C-00-6004-00]. The consultant team was composed of the following specialists:

John H. Eriksen, Team Leader and Agricultural Economist  
Jack W. King, Jr., Agronomist  
William D. Pardee, Seed Program Specialist  
Miles G. Wedeman, Research Management Specialist.

The consultant team was in Burundi from 6 March to 4 April 1992 reviewing the available literature, conducting interviews with a wide range of respondents, and visiting projects and sites of interest throughout the country.

At the end of the mission in Burundi, a comprehensive draft report containing the team's findings, conclusions and recommendations related to the USAID Mission's evolving medium-term development assistance investment strategy was submitted to the USAID Director. The report was discussed and debated in depth with the Director and USAID staff.

The consulting report was finalized in Ithaca, New York during April 1992 and submitted to the University of Arkansas and, through it, to the USAID Mission as per terms of the contract.

In submitting the final report, the Ithaca International Limited consultants wish to express their appreciation for the assistance provided by the Small Farming Systems Research Project and the USAID Mission in Bujumbura, Burundi, and the staff of the International Agriculture Program office at the University of Arkansas for the excellent professional and logistical support provided to the consultant team. We also wish to express our gratitude to the many Burundians from the public and private sectors and representatives of external donor agencies, international research centers and regional research networks for sharing with us their observations and comments on the state of the Burundian agricultural economy.

In submitting this final report, the consultant team accepts responsibility for such factual errors as may remain in our text.

## ACRONYMS

ABEDA	Arab Bank for Economic Development for Africa
ADB	African Development Bank
ADF	African Development Fund
ADRAI	Association for the Development of Integrated Agronomic Research
AFNOR	Association Francaise de Normalisation/French Association for Weights and Measures
AFRENA	Agroforestry Research Networks for Africa
AFVP	Association of French Volunteers for Progress
AGCD	Administration Generale de la Cooperation au Developpement/General Administration for Cooperation on Development
ALCOVIT	Aliments Composes Vitaminises/Local Parastatal Livestock Feed Company
ARR	Ateliers Regionaux de Recherche
ARRSE	Assistance a la Restructuration et au Renforcement des Services de l'Elevage/Project for the Restructuring and Strengthening of Livestock Services
AVICOM	Private Livestock Producer
BCC	Burundi Coffee Company
BEPP	Burundi Enterprise Promotion Program
BEST	Burundi Enterprise Support and Training Project
BNDE	Banque Nationale de Developpement Economique/National Economic Development Bank of Burundi
BRAGITA	Brasserie de Gitega/Gitega Brewery
BRARUDI	Brasserie et Limonaderie du Burundi/Brewery and Soft Drink Plant in Bujumbura
BRB	Banque de la Republique du Burundi/Bank of Republic of Burundi
BTC	Burundi Tobacco Company
BURUPRIM	Local company engaged in exports of green beans, papaya and pineapples
CADEBU	Caisse d'Epargne du Burundi/Burundi Savings Bank
CCCE	Caisse Centrale de Cooperation Economique/French Central Fund for Economic Cooperation
CIAT	Centro Internacional de Agricultura Tropical/International Center for Tropical Agriculture
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo/International Center for the Improvement of Maize and Wheat
CIP	Centro Internacional de la Papa/International Potato Center
CIP	Commodity Import Program
CNRST	Conseil National de la Recherche Scientifique et Technologique/National Council on Scientific Research and Technology
CNS	Conseil National Semencier/National Seed Council
COGERCO	Compagnie de Gerance du Coton/Company for Cotton Management
COLEACP	Comite de Liasion Europe-Afrique-Caraibes et Pacifique/Committee for the promotion of tropical fruits, off-season vegetables, flowers, foliage plants and spices in Europe, Africa, the Caribbean and the Pacific
COOPEC	Cooperative d'Epargne et de Credit/Credit and Saving Cooperative
COTEBU	Complexe Textile de Bujumbura/Bujumbura Textile Plant

CRIP	Cellule de Recherche de Inventaire Phytosanitaire/Unit for Research on Phytosanitary Products
CTB	Cooperation Technique Belge/Belgian Technical Cooperation
CVHA	Projet Cultures Viverieres de Haut Altitude/Project for High Altitude Food Crops
DCPE	Document-Cadre de Politique, Economique et Financiere Moyen Terme, 1991-94/Economic and Financial Policy Framework Paper for the Medium-Term 1991-1994
DDC	Departement de la Defense des Cultures/Department for Crop Protection
DEFA	Departement de l'Enseignement et de la Formation Agricole/Department for Agricultural Education and Teaching
DELIPRO	Center for Assistance to Development with Liberty and Progress
DEMSP	Departement Etudes du Milieu et Systemes de Production/Department for Studies of the Environment and Farming Systems
DGAE	Direction Generale de l'Agriculture et de l'Elevage/Office for Agriculture and Livestock
DGV	Direction Generale de la Vulgarisation/Office of Agricultural Extension
DPV	Departement des Production Vegetales/Department of Crop Production
EAP	Environment Action Plan
EARSAM	East Africa Sorghum and Millet Network
EC	European Community
ESARRN	East and Southern Africa Rootcrops Regional Network
FAC	Fonds d'Assistance et Cooperation/Cooperation and Assistance Fund
FACAGRO	Faculte d'Agronomie/Faculty of Agriculture at the University of Burundi
FADI	Fabrication et Distribution d'Insecticides/Public Enterprise engaged in production and distribution of insecticides
FAO	Food and Agriculture Organization of the United Nations
FAVA	Programme Fertilisation des Agrosystemes Vivriers d'Altitude/Program on Soil Fertility in High Altitude Food Production Systems
FBu	Francs Burundais/Burundian Franc
FED	Fonds Europeens du Developpement/European Community Development Fund
FRUITO	Local company engaged in exports of passion fruit
GDP	Gross Domestic Product
GEBUCO	Local company engaged in exports of green beans, papaya and pineapples
GNP	Gross National Product
GOB	Government of Burundi
GTZ	Deutsche Gesellschaft fur Technische Zusammenarbeit/German Technical Assistance Agency
HPB	Huilerie de Palme du Burundi/Burundi Palm Oil Plant
IARC	International Agricultural Research Center
IBPGR	International Board for Plant Genetic Resources
IBSRAM	International Board for Soils Research and Management
ICA	International Coffee Agreement
ICRAF	International Council for Agroforestry Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDA	International Development Association
IDRC	International Development Research Centre

IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Center
IITA	International Institute of Tropical Agriculture
ILCA	International Livestock Centre for Africa/Centre International Pour l'Elevage en Afrique [CIPEA]
ILO	International Labor Organization
IMF	International Monetary Fund
INEAC	Institut pour l'Etude Agronomique du Congo/Institute for Agricultural Research in the Belgian Congo
INECN	Institut National pour l'Environnement et Conservation de la Nature/National Institute for the Environment and Nature Conservation
INIBAP	International Network for the Improvement of Bananas and Plantain
IRAT	Institut de Recherche Agronomique Tropicale/French Institute for Research on Tropical Agriculture
IRAZ	Institut de Recherche Agronomique et Zootechnique de la Communaute Economique des Pays des Grand Lacs/Institute for Agricultural and Livestock Research
IRCC	Institut de la Recherche de Cafe et de Cacao/Institute for Coffee and Cacao
ISABU	Institut des Sciences Agronomiques du Burundi/Burundi Institute of Agricultural Sciences
ISNAR	International Service for National Agricultural Research
ISTEEBU	Institut Statistiques et Etudes Economiques/Institute for Statistics and Economic Studies
LCB	Laiterie Centrale de Bujumbura/Bujumbura Central Milk Plant
MATE	Ministere de l'Amenagement, du Tourisme et de l'Environnement/Ministry of Land Development, Tourism and Environment
MDRA	Ministere du Developpement Rural et de l'Artisanat/Ministry of Rural Development and Cottage Industry
MINAGRI	Ministere de l'Agriculture et de l'Elevage/Ministry of Agriculture and Livestock
NAR	National Agricultural Research Institution
OCIBU	Office du Cafe du Burundi/Burundi Coffee Office
ONAMA	Office National de Mecanisation Agricole/National Office for Agricultural Mechanization
OPEC	Organization of Petroleum Exporting Countries
OPHAVET	Office Pharmaceutique Veterinaire/Office for Veterinary Products
OTB	Office du The du Burundi/Burundi Tea Office
PAAD	Program Assistance Approval Document
PASA	Projet d'Appui aux Secteurs Agricoles/Agricultural Sector Support Project
PEP	Public Expenditure Program
PFC	Projet Filiere Cafe/Coffee Project
PFP	Policy Framework Paper
PIA	Projet Insemination Artificielle/Artificial Insemination Project
PIP	Public Investment Program
PNS	Plan National Semencier/National Seed Plan

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PRAPACE	Programme de la Recherche pour l'Amelioration de la Pomme de Terre en Afrique Centrale et de l'Est/Program for Research on Potato Improvement in Central and East Africa
PRELAAC	Programme Regional pour l'Evaluation des Lignes Avancees en Afrique Centrale/Regional Program for the Evaluation of New Crop Varieties in Central Africa
REDSO/ESA	Regional Economic Development Services Office for East and Southern Africa
RUZIZI	Societe Industrielle et Agricole de la RUZIZI/Ruzizi Agricultural Company
SAB	Local Livestock Production Company with Public and Private Participation
SAF	Structural Adjustment Facility
SAFGRAD	Semi-Arid Foodgrains Research and Development
SAL	Structural Adjustment Loan
SAP	Structural Adjustment Program
SARGIA	Systeme d'Alerte Rapide et de Gestion de l'Information Agricole/Early Warning and Agricultural Information Management System
SCEP	Service Charge des Entreprises Publiques/Service charged with supervision of Burundian Public Enterprises
SER	Societe Mixte pour l'Exploitation de la Ferme de RANDA/Randa Farm Company
SFA	Special Facility for Africa
SFSR	Small Farming Systems Research Project
SNPV	Service National de Protection des Vegetaux/National Crop Protection Service
SNS	Service National Semencier/National Seed Service
SODECO	Societe de Deparchage et de Conditionnement/Coffee Processing Company
SOGESTAL	Societe de Gestion des Usines de Lavage de Cafe/Company for Management of Coffee Washing Plants
SOKINABU	Societe d'Exploitation du Quinquina/Quinine Production Company
SOSUMO	Societe Sucriere du Moso/Moso Sugar Company
SPA	Special Program of Assistance
SRD	Societe Regional de Developpement/Regional Development Company
SSB	Societe Semenciere du Burundi/Burundi Seed Company
UNCTAD	United Nations Commission for Trade and Development
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UPC	Usine de Produits en Coton/Cotton Plant
USAID	United States Agency for International Development
VERRUNDI	Verrerie du Burundi/Burundi Bottle Production Plant
WFP	World Food Program
WMO	World Meteorological Organization

## EXECUTIVE SUMMARY

The principal objectives of this report are to analyze the potential and problems of the agricultural economy in Burundi and to suggest to USAID management what areas and activities within this economy might merit USAID attention over the medium-term. By any standard, the country's economy is agriculturally based: over 90 percent of the 5,300,000 Burundians reside on rural farmsteads and over 80 percent of effective employment derives from agriculture. The concentration is on the growing of a few export crops, most notably coffee, and a variety of food crops, typically both types being grown together. Physically, Burundian agriculture is characterized by very small farms, relatively poor soils, and a lack of land for further expansion. All of these factors compel Burundi to face urgently the question of how to get more production out of existing land to feed the burgeoning population without contributing further to the deterioration of the environment.

The country struggles with major handicaps. The modern economy is dominated by inefficient, loss-making public enterprises, with a stunted private sector toiling in their shadow. The government's hand is heavy and only limited progress has been made since 1986 to loosen its grip through IMF and World Bank structural adjustment programs. Distortions in the economy are perpetuated by donors, except USAID, in their tilt toward the public enterprises and export crop agriculture at the expense of food crops.

Despite these pressures, the stated priority objective of the GOB is to bring about 3.5 to 4 percent growth in food productivity in the period 1990 to 1994, just barely enough to keep up with the pace of population growth. We wholeheartedly endorse this conclusion and, therefore, focus on how this gain in food crop production can be achieved without an expansion in land under cultivation and further deterioration in the environment. We recommend a two pronged approach.

In the medium-term, we believe that major improvements in the Burundian agricultural economy must be generated from a continuous flow of innovations in agricultural production techniques and from increasing farmer access to agricultural inputs through a gender-neutral, permanent and private sector system for input distribution. We fear that the present donor policy of putting an overwhelming proportion of resources into downstream elements of the total production/processing/marketing chains will rather quickly be reduced to an exercise of tinkering at the margins while more fundamental problems go unaddressed.

By encouraging and supporting private entrepreneurial activity in input supply and distribution, the USAID strategy can directly address the problem of the low-level equilibrium in Burundian agricultural production. The effect will be to generate broad-based and equitable benefits; while, at the same time, initiating the positive feedback to encourage further entrepreneurial activity. Specific opportunities exist in improving quality seed availability, importing selected inputs, stimulating domestic production of lime, and expanding private distribution channels.

Intensification of food crop production presents a challenge to agricultural research. Some striking technological innovations have been obtained and adopted in potatoes through the joint

efforts of ISABU, the responsible international agricultural research center, and the associated regional potato research network. Applying the same approach to a few other selected crops seems the best way to focus on and realize the objective of higher productivity.

USAID is considered by the GOB to be in an enviable neutral position vis-a-vis the conflicting interests and difficult problems surrounding the privatization of several agricultural and agro-industrial enterprises and has already been invited to provide direction and technical assistance in the process for several key enterprises. We see the assumption of this role for one or more enterprises as critical to the prospects for the overall medium-term USAID strategy linked to greater private sector participation in the agricultural economy.

Based on our analysis, we recommend USAID adopt the following key elements of a strategy vis-a-vis development of private sector participation in the agricultural economy of Burundi:

1. Development of a Commodity Import Program [CIP];
2. Encouragement of a Permanent, Private and Gender-Neutral System for Distribution of Agricultural Inputs in Burundi;
3. Assistance to the Privatization of Public Agro-Industrial Enterprises through the existing Burundi Enterprise Promotion Program [BEPP]/Burundi Enterprise Support and Training Project [BEST] mechanism;
4. Targeted Support for Analysis of Potential Non-Traditional Export Crops, also through the BEPP/BEST mechanism;
5. Support for Agricultural Research in Burundi through the International Agricultural Research Centers [IARCs] and existing Regional Research Networks; and
6. Training of agricultural specialists through the IARCs, the United States Land Grant Universities, and other educational facilities.



# **MAIN REPORT**

## I. INTRODUCTION

The principal objectives of this report are to analyze the potential and problems of the agricultural economy in Burundi and to suggest to USAID management what areas and activities within this economy might merit USAID attention over the medium-term. In this regard, the team has carefully avoided placing its work within the classical nomenclature of macroeconomists and planners -- i.e., the primary, secondary and tertiary sectors; public versus private activities; rural versus urban groupings. We believe such classifications have little relevance to the Burundian situation at present and that juxtaposing such terms contributes more confusion than clarity to discussions of USAID country strategy.

We present our observations and conclusions, therefore, in terms of the Burundian agricultural economy because that economy by virtually any measure is agriculturally based. Over 90 percent of the country's population resides outside towns and villages on rural farmsteads. The socio-economic orientation of these farmsteads -- estimated at approximately 900,000 to 1,000,000 family units -- is in the first instance toward a single hillside community -- *colline* in French.

Over 80 percent of effective employment -- formal and informal -- in Burundi is agriculturally based, either directly as labor in crop and livestock activities on-farm or indirectly through agroprocessing, commodity marketing, and related support enterprises -- e.g., transport, supply of agricultural inputs, provision of basic products to the rural population. The level of formal employment unrelated to agriculture is extremely low and dominated by wage employment in the government agencies and public enterprises -- e.g., public administration, education, health, and projects supported by external donor funding.

Foreign exchange earnings from agricultural commodities generate over 90 percent of all export earnings, with coffee alone bringing in over 80 percent in most years. Domestic revenue generation is also heavily dependent on export taxes levied on a few commodities and receipts from agro-industries. And, in the final analysis, the national economic aggregates -- i.e., gross domestic product [GDP], balance of payments, etc. -- literally rise and fall in response to changes in world prices for a few basic commodities -- e.g., coffee, tea, cotton, hides and skins. Opportunities for domestic employment outside agriculturally based enterprises are extremely limited and there is very little by way of a buffering effect on economic performance from non-agricultural industrial production.

In the simplest terms, the Burundian economy cannot grow satisfactorily in the last decade of the twentieth century without a vibrant and efficient agricultural economy. This is so because of the overwhelming importance of agricultural enterprises in the national economy at present. In this sense, Burundi has made much less of an economic transition since independence than many other countries in Africa.

Equally important, success in agriculture is vital to the intersectoral transfers -- i.e., wage-goods and capital -- from agriculture to industry that will be critically needed in the medium-term if Burundi is to establish and maintain competitive industrial wages -- e.g., in the textile industry

-- and to finance capital purchases for small and medium-scale industrial enterprises.

In this regard, Burundi has a number of challenges to surmount. In physical terms, it is a small, mountainous country. The uplands consist of a mountain crest area, with peaks rising over 2,200 meters; and a central plateau which lies at altitudes between 1,200 and 2,000 meters. Lowland areas consist of two plains -- one in the east and south bordering Tanzania and the other in the northwestern portion of the country.

These areas support at least four generalized farming systems. In these systems, the relative importance of individual crop/livestock enterprises varies largely as a function of altitude and changes in soil fertility. All farming systems in Burundi are subsistence based. While each system produces one or more export crops to generate cash returns, farmers in all systems still devote the majority of their land and family resources to production of food crops. In this regard, there is little specialization in agricultural production among regions, other than that brought about by natural conditions of altitude, soils and rainfall distribution.

In geographic orientation, Burundi is relatively more isolated than its neighbors to the east and south with respect to both surface and air transport. This problem has been accentuated in recent years by the closing of the main surface transport route through Rwanda, Uganda and Kenya. The need to use longer and less developed transport routes through Tanzania and other countries to the south has had serious consequences for the costs of the country's imports and the competitiveness of its exports. Similarly, unsubsidized air freight rates on the two intercontinental carriers servicing Burundi from Europe are high enough to make exports of most commodities non-competitive in European Community [EC] markets.

By contrast, the road infrastructure within Burundi -- at least at the primary level -- is surprisingly well developed, with hard surface, all weather roads reaching every part of the country. Beyond the primary road system, however, the transport infrastructure is considerably less developed and its expansion will continue to be hampered by the mountainous terrain in the interior and the existing residential pattern of widely separated rural households. Provision of other public infrastructure and services -- electricity, water, communications -- appears in general to be concentrated mainly in Bujumbura, a few small towns, and strips bordering the main roads.

While Burundi has the second highest overall population density in Africa [209 persons per square kilometer in 1990], the population is not distributed equally throughout the country. Rapid population growth over the last two decades has been a major factor in reducing the average size of agricultural land holdings to only 0.8 hectares -- but with wide variance around this average.

In northern portions of the central plateau, densities often exceed 400 people per square kilometer and the pressures per hectare of available cropland are much higher. Farmers routinely plant crops -- both perennial and annual -- on hillsides with slopes exceeding 30 percent. Under less crowded conditions and more rational land use planning such slopes would not be cultivated at all but left in natural forest growth to protect watershed areas.

Further south in the uplands, population densities are lower but the potential of the resource base also declines dramatically as a result of more problematic soil conditions and the fact that there are fewer and narrower marsh areas in the mountain valleys. For these reasons, one observes a greater reliance on livestock enterprises in the farming system of this region as households seek to exploit increasingly marginal land through extensive grazing of cattle, goats and sheep.

In the lowland plains, traditional food crops -- bananas, cassava, sweet potatoes, dry beans, sorghum, maize, etc. -- are still present in the farming system but major cash crops change from coffee and tea to cotton, sugarcane, tobacco and oil crops. The Imbo plain in the west also has been the site of most recent activities in dairy farming and production of higher value non-traditional export crops -- e.g., off-season vegetables, fruit, cut flowers, and foliage plants.

For the most part, formal commercial linkages between urban and rural areas and between sectors in Burundi are neither well developed nor broadly participatory. This appears to be the result of several interrelated factors. Among these are:

- ◆ The high degree of direct household consumption and local exchange of the food crops;
- ◆ The narrow processing and marketing channels used for traditional export crops;
- ◆ The quasi-monopolistic position of public enterprises in all phases of the domestic economy;
- ◆ The discouragement of private entrepreneurial participation in the economy by public authorities; and
- ◆ The influence of government restrictions on the free movement of factors between markets in the domestic economy.

Finally, the business climate in Burundi, as in any other country, has been and continues to be influenced by the political climate in the country. Political relationships since independence in 1962 have been plagued by ethnic conflicts between the two major tribal groups, which have led to open civil strife over the period. This problem has been compounded by the country's difficult position vis-a-vis neighboring countries -- e.g., deterioration of trade relationships due to political and economic chaos in Zaire; closure of the primary road system from Burundi to Nairobi and Mombasa due to regional conflicts; the commercial difficulties related to being a Francophone country whose most important neighbors are all Anglophone in language and orientation [Zaire and Rwanda excepted].

While recent decisions via the electoral process have given substance to the hopes that a process of political reconciliation is underway, the accumulated history of the last thirty years has had obvious consequences within the local private business community. Having observed several government seizures of major private business assets in recent years, local entrepreneurs -- both local and expatriate -- display an understandable reticence to invest capital assets and/or

aggressively exploit domestic business opportunities. For example, private businesses engaged in supply of agricultural inputs operate primarily in response to a public tendering system which supplies government and donor projects, but they apparently have made few efforts to extend their marketing efforts beyond these relatively narrow markets.

## **II. AN APPRAISAL OF THE MACROECONOMIC ENVIRONMENT IN BURUNDI**

Since 1986, the macroeconomic environment in Burundi has been conditioned by four Policy Framework Papers [PFPs], produced by the Government of Burundi, in collaboration with the World Bank and the IMF. These were supported by a series of Structural Adjustment Loans [SAL I for a total of US \$ 50 million and SAL II for a total of US \$ 155 million], each financed by the World Bank and a group of co-financers. Several annual Structural Adjustment Facility agreements [SAFs] with the International Monetary Fund [IMF] were also put in place over this period. A SAL III and a parallel SAF are now under consideration, based upon the fourth PFP issued by the GOB in August 1991. If all conditions can be met and negotiations completed in early 1992, the presentation of the program in Washington is expected by April 1992.

In the period of 1986 to 1991, the execution of the structural adjustment program [SAP] was distinctly uneven due mainly to adverse external factors -- i.e., security problems and the continuing decline in world prices for Burundi's principal export, coffee -- and problems internal to the management of the SAP process. SAL II execution, for example, was to have been effected in the period from mid-1988 to the end of 1989. In fact, the program was executed over three years, with disbursement of the second loan tranche delayed by 15 months and the third tranche delayed by 18 months.

While some progress was made over the period in improving techniques for presentation of government budgets and periodic adjustments were made to correct an overvalued exchange rate, the deficit in the balance of payments current account remained on average at 15 percent of gross domestic product [GDP]. This performance was essentially unchanged from the period 1980/1985 before initiation of the SAP.

Over the past five years, the absence of rigorous measures by government to correct deficiencies in establishment and allocation of the national budgets -- i.e., recurrent and investment -- has been one of the principal obstacles in the adjustment process. Even though the overall budget deficit was reduced from 17 to 9 percent of GDP between 1987 and 1989, this trend was reversed in 1990 when the deficit rose to 13.5 percent of GDP. While the budgetary process has improved in a qualitative sense, with movements toward more transparent accounts and a unified budget presentation, significant problems remain with the process of allocating available resources between different sectors and budget categories.

For example, there is a chronic problem of underfinancing of non-salary recurrent costs in support government programs. Moreover, high budget allocations in favor of higher education and hospitals have diverted domestic financial resources away from more directly productive activities. As a result, social sector expenditures grew steadily during the period of the SAP and now amount to 33 percent of total expenditures and 4.4 percent of GDP, debt service not included. These problems are compounded by public expenditures related to security issues. Expenditures in this category are now estimated to cost 4 percent of GDP and contribute

significantly to the external debt problem.

One serious consequence of these budgetary choices is that development activities in the directly productive sectors -- and, particularly, in agriculture and related agro-industries -- are heavily dependent on external donor financing. This has led to the proliferation of donor designed and financed projects and programs, with obvious consequences for government in control and coordination of key economic initiatives. It brings into serious question the actual relevance of government policy declarations on sectoral development -- e.g., the *Politique Sectorielle de l'Agriculture et de l'Elevage* [Ministere de l'Agriculture et de l'Elevage, 1988] in an environment where donor agencies largely control project design; the levels of loan and/or grant funding; and, in most instances, the expatriate decision-makers who actually manage the activities.

Reflective of growing economic pressures and security programs, the gap between the official and parallel market exchange rates for the Burundi franc [FBu] widened to about 30 percent after 1990 and only increases in external donor financing permitted the GOB to avoid a more serious financial crisis. Improvements in the government's foreign exchange holdings over the period can be attributed largely to excessively high projections of import requirements by the World Bank in determining SAL funding levels -- i.e., projected at 10 percent per annum versus an actual growth of only 0.8 percent.

In addition to allocatory problems with the national budget, the government has been somewhat less than rigorous in its approach toward reforming the inefficient public enterprises it has created over time and rationalizing the rates charged for delivery of public services. Although the SAP contained various objectives and conditionalities aimed at creating an improved environment for private sector participation and diminishing and restructuring the role of public enterprises in the economy, little progress has been made in this area. Private participation in the economy is still largely limited to transportation enterprises and small-holder production of food crops and handicrafts, coupled with a limited number of recent attempts by private entrepreneurs to operate enterprises directed at export of "non-traditional" agricultural products.

During the period, the government made commitments under the SAP to reduce the burden imposed on government finances by public enterprises through introduction of full cost pricing and performance contracts for enterprises to be "rehabilitated" and, in a general sense, opening the economy to private participation and competition. It was to have begun a process of liquidating public enterprises deemed to be non-viable and identifying others for full privatization or increased private participation.

On the positive side, according to the World Bank, some progress was made under SAL II in:

- ◆ Strengthening the *Service Charge des Entreprises Publiques* [SCEP] -- the GOB agency in charge of supervision of the public enterprises;
- ◆ Improving the availability of data on the public enterprises;

- ◆ Establishing performance contracts with some of the enterprises to be rehabilitated;
- ◆ Increasing recovery of public funds borrowed and on-lent to public enterprises and collecting of dividends and taxes from them; and
- ◆ Cutting staff in two enterprises to improve efficiency.

On the negative side, progress has been lacking in the following SAP components:

- ◆ Improving the enterprises' financial management and efficiency [one or two enterprises excepted];
- ◆ Setting up effective management teams;
- ◆ Instituting an appropriate employment policy based on productivity criteria; and
- ◆ Opening the public enterprise sector to private investors.

In addition to the lack of sufficient progress in these areas during the SAP period the government has continued to acquire shares in the existing public enterprises and has actually created seventeen new public enterprises since 1986. Furthermore, even though diagnostic studies were completed for some enterprises and performance contracts signed, many measures recommended in the rehabilitation program were only partially implemented. It was not until January 1991 -- five years after the initiation of the SAP -- that the government adopted a sector policy document that determined which public enterprises were to be liquidated, rehabilitated or privatized in terms of management or capital. [World Bank, Project Completion Report, 1991].

In the second half of 1991, preparatory steps were underway to formulate a third phase of the SAP. The contents of this phase are currently being negotiated based on two key documents: the Quatrieme Document-Cadre de Politique Economique et Financier Moyen Terme, 1991-1994 [DCPE] issued by the government in August and the Memorandum Initial for the Troisieme Credit a l'Ajustement Structurel issued by the World Bank in September.

At present, it is proposed that the SAL III will concentrate on two areas of reform identified in the DCPE. These are:

- ◆ Management of public resources with restructuring of public expenditures and the public enterprise portfolio; and
- ◆ Removal of macroeconomic constraints which hinder development of the private sector.

Efforts to improve management of public resources will concentrate on:

- ◆ Finalization of a unified budget process;
- ◆ Rationalization of public resource allocation through improved programming and budgeting of public expenditures and investment;
- ◆ Reductions in public expenditures directed at other than development activities; and
- ◆ Acceleration of public enterprise reform.

Promotion of private sector participation and an export-driven economy will be directed at:

- ◆ Improvement of the business environment;
- ◆ Greater liberalization in external transactions;
- ◆ Introduction of a foreign exchange system more reflective of market forces;
- ◆ Liberalization of domestic factor markets; and
- ◆ Pursuit of prudent fiscal policies which will "avoid effective elimination of the private sector" from participation in the formal economy.

These activities will be supported by a social safety net program aimed at mitigating the social effects of structural adjustment through priority allocation of public expenditures to improve the quality of basic services in health and education.

The parallel IMF SAF will concentrate on:

- ◆ Reform of the system for allocation of foreign currencies;
- ◆ Liberalization of the import/export system with initiation of a general system for licensing through commercial banks;
- ◆ Progressive liberalization of service charges in the foreign trade regime; and
- ◆ Establishment of reference targets in management of public expenditures, global budget deficits, and public savings.

The quantitative macroeconomic objectives projected for the third phase of the SAP [1991-1994] are:

- ◆ An average growth of 4.3 percent per annum in GDP, with sectoral growth of 3.8 percent in agriculture, 9 percent in manufacturing and 3 percent in services;
- ◆ A reduction in the rate of inflation from 7 percent in 1990 to 4 percent in 1994;
- ◆ A reduction in the current balance of payments deficit [grants not included] from 19 percent in 1990 of GDP to 14 percent in 1994; and
- ◆ A reduction in the global budget deficit on a commitment basis [grants not included] from 13.5 percent of GDP in 1991 to 4 percent in 1994.

In the context of the SAL III, the liberalization of the agricultural sector is deemed critical for the development of a dynamic private sector in the short and medium-term because the development potential of Burundi lies in agriculture. The key reforms in the sector will be:

- ◆ Simplification of the framework and rules pertaining to smallholder farming practices, including elimination of rules pertaining to obligatory planting of certain crops and restrictions on the types and quantities of agricultural inputs used;
- ◆ Elimination of the government's system for fixing producer commodity and agricultural input prices;
- ◆ Elimination of monopoly rights previously granted to public enterprises for purchase, sale and processing of agricultural commodities;
- ◆ A moratorium on all new public investments in tea, rice and palm oil enterprises; and
- ◆ Establishment of a set of clear regulations governing the allocation of lands in the public domain.

The anticipated reforms in the agricultural sector will be supported by parallel reforms to restructure and/or privatize public agro-industrial enterprises. These enterprises constitute a major portion of industrial/manufacturing sector in the Burundian economy. Since 1986, the total number of public enterprises has grown from 74 to 86, despite the liquidation of 5 enterprises over the period.

The activities of these enterprises and public transfers to them have generated a significant debt burden for the government [FBu 8.9 billion in 1989 or approximately 5 percent of GDP]. In light of this fact, the government has recently declared its intention to reform the sector. Public enterprises have now been grouped in five categories:

- ◆ Ten enterprises which are to remain under public control, of which five will be placed under private management and 4 will be rehabilitated;
- ◆ Twenty-six enterprises for which all capital holdings are to be transferred to private investors;
- ◆ Twelve enterprises whose functions and capital holdings are to be reabsorbed by designated government services;
- ◆ Thirteen enterprises which are to be restructured to improve operating efficiencies; and
- ◆ Twenty-five enterprises whose future status has not yet been determined.

The initial SAL III memorandum sets out a proposed schedule for government action in privatization and rehabilitation of these enterprises tied to loan tranche disbursements.

Finally, specific reforms in the agriculture and agro-industrial sectors are to be accompanied by a series of more generalized public sector reforms aimed at providing incentives for development of the private sector. Key among these reforms are:

- ◆ Introduction of an exchange rate system reflective of the market conditions faced by Burundi;
- ◆ Adoption of a coherent commercial code;
- ◆ Completion of tariff reforms to reduce the effective rates of protection on domestic products;
- ◆ Revision of the labor code to promote employment creation; and
- ◆ Reform of the structure of taxes pertaining to business income.

While it is much too early for constructive speculation as to the likely success of the SAL III, it should be said that the current documents under negotiation appear to present a much tighter SAP focused on a few key economic issues. The number of conditionality statements in the SAP have been reduced significantly since SAL II and appear to be better targeted. And, finally, the calendar of achievement of SAP benchmark objectives and disbursement of loan tranches seem to be realistic and attainable given sustained displays of the necessary political will by government and by the World Bank.

### III. KEY POLICIES AND PRIORITIES IN THE AGRICULTURAL ECONOMY

To our knowledge, the most recent statement of the government's policies and priorities with respect to the agricultural sector is contained in the Document-Cadre de Politique Economique et Financiere Moyen Terme, 1991-1994. This policy framework paper was issued in August 1991 and is being used as the basis for SAL III negotiations. It was preceded by the Politique Sectorielle de l'Agriculture et de l'Elevage issued by the MINAGRI in September 1988 and the Evaluation de l'Etat d'Execution de la Politique Sectorielle du Ministere de l'Agriculture et de l'Elevage issued in July 1990. The latter document constitutes the government's own appraisal of the success of its agricultural sector policy during the period June 1988 to July 1990.

Since the government's sector strategy statement of August 1991 is both the most recent and the most succinct available on planning for the agricultural sector, it is quoted here in its entirety. [Translation from French by the authors].

"In the agricultural sector, structures and measures will be put in place [over the period 1991/1994] to permit increases in productivity levels particularly for food crops, so as to improve national food security. Actions will be taken to remedy the economic and financial difficulties in certain agro-industrial chains by restructuring the concerned public enterprises, liberalization of agricultural input and commodities markets, strengthening physical and financial monitoring of both projects and public enterprises, and by increasing and diversifying production of export crops.

These essential measures must be undertaken to attain the objective of realizing 3.5 to 4 percent growth in the food crops sector over the program period. Essential measures include control of soil erosion which degrades the land base, generalizing use of animal manure and improved seeds, intensification of research, progressive elimination of subsidies on agricultural inputs, implementing a national seed plan, and putting into place a liberalized commercial system for distribution of chemical fertilizers in conformity with the Agricultural Sector Support Project supported by the World Bank. It will be necessary to reorient agricultural research toward the needs of farmers and to increase the national contribution to development of an integrated system of research/extension in the context of regional ateliers and with the financial participation of the agro-industrial enterprises.

Agricultural extension in the future must be conducted in the context of respect for the farmers and their professional associations -- i.e., farmer freedom in the choice of innovations, freedom in adoption decisions, and farmer responsibility for the consequences of their actions, taking into account the farmers' objectives, and using demonstration techniques, rather than imposed constraints and rules.

A permanent system must be put in place to gather information about prices and quantities of food commodities and the evolution of domestic and external market conditions and to disseminate this information not only in French but in Kirundi by radio and television so that farmers have better knowledge of the demand conditions for their produce. This permanent system for agricultural statistics will be based on actual surveys to provide a reliable basis for analysis and planning.

With respect to livestock activities, the government intends to promote privatization in production of dairy and meat products and to redeploy domestic and external human and financial resources to favor this sector. Financial disparities between agricultural and livestock inputs will be eliminated to facilitate association of crop and livestock enterprises.

With respect to export crops, the strategy for the traditional export crops will be to extend the areas planted and/or to increase plant densities on existing hectares, as well as increasing the quality of the commodities produced. Improvements in quality will be promoted by having concerned agro-industries adopt a system of producer remuneration based on differences in product quality and by investments in new technologies -- e.g., coffee washing stations, extension of tea processing facilities. The private sector will be invited to invest in agro-industries -- e.g., coffee washing stations, tea factories, oil extraction plants -- and will be encouraged to develop non-traditional export enterprises. The volume of tea exported will double exports in 1989 to a total of 6,000 metric tons in 1993. It is anticipated that private investors will be responsible for installation and financing of a new tea factory in Remera.

The comparative advantage of cotton in certain regions must in the future be translated into remunerative prices for producers and the constraints which have impeded cultivation of cotton must be removed. Ginneries and other plants in the cotton and textile sector must base their prices on market conditions. The policy will be to optimize foreign exchange earnings from the cotton sector by diversifying production of finished textile products and lint cotton.

New export crops will be developed through agronomic research conducted in collaboration with private entrepreneurs and public investments in export infrastructure like cold storage plants. The liberalization of input and commodity markets will permit improvements in the financial situations of certain agro-industrial enterprises. Inefficiencies in these enterprises will be detected and their removal will permit better allocation of resources and a more transparent system of subsidies. In this policy framework, the restructuring of the regional development societies must be accelerated toward the end of leaving commercial and industrial activities in the hands of private enterprises and producer associations.

Reform of the coffee sector will be a key element in the adjustment program. Significant progress will be forthcoming in 1991/1992 with the assistance of the project for the coffee sector supported by the World Bank. Reforms will include improving efficiencies by removing regulations on coffee production and permitting private investors to participate in coffee marketing. The key characteristic of the envisaged reform will be a new system of remuneration to encourage production in response to market conditions and not based on a sliding price scale linked to estimated production costs. This new system must be directed at increasing productivity and result in increased production of higher quality coffee."

The government policy statement of August 1991 presents a blueprint of aspirations for the agricultural economy. As such, it appears to us to be a clear and internally consistent statement. However, experiences over the period of SAL I and SAL II have demonstrated certain disparities between the government's declarations of policy changes and actual implementation of those changes. We feel that there are three key relationships implied in the government's strategy which will bear monitoring over the SAL III period. They are:

- ◆ Whether the government, with external donor assistance, is able to actually implement the balanced approach to food security and export crop promotion set forth in the strategy or whether actual program and project funding will continue to be heavily biased toward the export sector to the neglect of food security issues as is now the case [see Carvalho, 1992 for details of current allocations];
- ◆ Whether government programs in agricultural research and extension will focus on increasing factor productivities in crop production per unit of arable land currently under cultivation or whether they will continue to tacitly accept the current situation where most increases in crop production are coming from expansion of cropping into upland marshes, the plains, and in areas with problematic soils; and from shifts from more nutritious grain crops to crops providing more carbohydrates per hectare; and
- ◆ Whether government will actually implement its stated program for restructuring and privatization of public enterprises and provision of greater incentives for private sector participation in the agricultural economy under the SAL III timetable or whether it will continue to drag its collective heels in a program that is so "progressive" that no significant transfers of economic power occur in the foreseeable future.

## IV. PRIORITIES AND CONSTRAINTS IN THE AGRICULTURAL ECONOMY

### A. Natural Resources and Land Use

#### 1. Land

The primary differentiation of land resources in Burundi is between the highlands and the plains. A second important differentiation is between the densely populated uplands and the areas which are less densely populated in the Bututsi uplands and on the Imbo and Moso plains.

The densely populated areas are the most important agricultural regions for both food and cash crops. These regions are characterized by a low-level, unresponsive production equilibrium based on eroded and degraded soils, continuous cropping, and the virtual absence of fallowing. Small farms and subsistence agriculture characterize existing farming systems.

The less densely populated regions are more important in terms of non-traditional, cash economy agriculture. In all three of these regions, there are significant areas of land which are level enough to be well-adapted to mechanized agriculture. There is an active land market in these regions.

The benchmark land use region in Burundi is found in the highlands between 1,400 and 1,800 meters elevation on slopes of less than 20 percent. Rainfall at this altitude varies between 1,000 and 1,500 millimeters, distributed in a bimodal rainfall pattern.

The efficiency of rainfall for crop production is increased at this altitude by cool temperatures and frequent cloud cover. These conditions are ideal for the sorghum-legume agriculture which, up to about 1900, had been the traditional agriculture on this land for about 800 years.

The evolution of land utilization in Burundi has been rapid during this century. The tension between a rapidly increasing population and available resources for agricultural production has caused a series of compounded modifications in agricultural practices and migrations to less favorable land. Land on steeper slopes and at higher and lower elevations was brought under cultivation. Of equal importance, a major shift from grain crops to root and tuber crops occurred.

Table 1 shows the distribution of land use in Burundi. Most of the land devoted to artificial forests is found in the highlands on soils which have degraded to the point that they are no longer of any use for farming. Pastureland refers to land which has severe limitations for cropping. Much of it is severely degraded land in the highlands. Some of this pastureland is found on the plains where irregular rainfall introduces a significant risk factor into dryland farming. Virtually all land in Burundi which is suitable for any possible modification of traditional agriculture is being utilized.

**Table 1**  
**Estimated Land Use in Burundi**

Category	Area in Hectares	Percent of Total Area
<b>Total Land Area</b>	2,783,400	100
<b>Cropland</b>		
Smallholder Cropland	786,955	28
Plantations	5,650	< 1
Marshlands	125,991	5
Artificial Forests	79,743	3
Pastureland	1,402,198	50
<b>Total Agricultural Land</b>	2,400,537	86
Permanent Water	215,133	8
Residential Land and Land in Natural Forests and National Parks	167,730	6
<b>Total Non-Agricultural Land</b>	382,863	14

**Source:** *Ministere de l'Agriculture et de l'Elevage. (1988). Politique Sectorielle de l'Agriculture et de l'Elevage, p. 22.*

a. **The Highlands**

The highlands are the most important agricultural region of Burundi. More than 90 percent of the food and cash crops in Burundi are grown in this area. There are four major agroecological zones in the highlands.

The Western Escarpment [Mumirwa] zone occupies 12 percent of the total land area of Burundi. It is characterized by steep slopes -- 70 percent to more than 100 percent -- with comparatively fertile soils. The altitude varies from 1,100 to 2,000 meters and results in a mild climate. Ranges for temperatures are 18 to 28 degrees Centigrade and for rainfall are 1,100 to 1,900 millimeters. The predominant crop is beer bananas. The major natural resource management problems in the Western Escarpment zone are soil erosion and rapid moisture loss on excessively well-drained soils.

In the Southern Nile-Zaire Divide [Bututsi and southern Mugamba] zone, which covers 11 percent of Burundi, many of the soils had degraded to a condition of severe aluminum toxicity before the 20th century. The northern part of the zone is mountainous and rugged but the south is a high plateau. Livestock production is the most important use made of the land.

Altitudes in this zone are from 1,700 to 2,500 meters. Temperatures are cool -- i.e., 14 to 15 degrees Centigrade and rainfall varies from 1,300 to 1,700 millimeters. Soils with severe aluminum toxicity is the major resource problem in this zone.

The Northern Nile-Zaire Divide [Northern Mugamba] zone is the tea region of Burundi and accounts for about 7 percent of total land area. The zone is similar to the Southern Nile-Zaire Divide zone except for the crucial fact that it has soils with less aluminum toxicity -- although the soils are still very poor for most crops. Rainfall averages 1,500 to 2,000 millimeters. Elevations are between 1,800 to 2,500 meters, which is slightly higher than in the Southern Nile-Zaire Divide zone. Average temperatures are the same for both regions. The topography in this region is steep with average slopes of 50 percent.

Tea is well adapted to this zone but the combination of high altitude and poor soils make it unsuitable for most other crops. Forestry and extensive livestock grazing are the other major production activities.

The Central Plateau is the richest agricultural zone in Burundi. Most of Burundi's coffee is produced in this area. The entire plateau is hilly and slopes -- averaging 25 percent -- are not excessively steep. This is the benchmark zone for highland agriculture in Burundi.

The Central Plateau is divided into two sub-zones -- i.e., the west [Buyenzi and Kirimiro] which covers 22 percent of Burundi and the east [Bweru, Buyogome and southern Bugesera] which covers 31 percent of the country. These sub-zones are differentiated by soil and climate. Temperatures in the west average 17 degrees Centigrade, while those in the east average 20 degrees Centigrade. The dry season is more strongly expressed in the east than in the west.

Marshlands, which can be used for dry season cropping, are found in the valleys throughout this region. The natural resources of this zone have proven to be exceptionally resilient considering the cropping pressures to which they have been subjected. Soil erosion and soil degradation are the major resource problems.

## **b. The Plains**

Traditionally the plains were not utilized for crop production, due to the health risks for humans and moisture risk for crops. They were, however, used to some extent as seasonal grazing lands.

The Moso Plain [Moso and parts of Buragane, Buyogoma, Bweru and Bugesera] lies along the Maragarazi river, which forms part of Burundi's eastern border with Tanzania. It covers 17 percent of the country. Elevations range from 1,000 to 1,500 meters. Average rainfall varies

from 1,100 to 1,300 millimeters and average temperatures vary seasonally from 20 to 23 degrees Centigrade.

The soils at higher elevations in the Moso Plain are poor. The marshlands along the river have better soils but they require drainage. The Moso Plain presently produces all of Burundi's industrial sugar and efforts are being made to introduce tobacco cultivation. Cotton and food crops are also grown on this plain. Gully erosion is the most serious resource management problem in this area.

The Imbo Plain lies along the Rusizi river in the northwest of Burundi and along Lake Tanganyika in the west and south. It covers 7 percent of the country and lies at the lowest altitudes -- 775 to 1,000 meters. It also has the lowest average rainfall -- 800 to 1,100 millimeters and the highest temperatures, averaging 23 degrees Centigrade throughout the year.

The Imbo Plain has some of the best soils in Burundi and has major advantages for development of modern agricultural enterprises in its close proximity to both the Bujumbura market and the only major airport in the country. It is characterized by mostly level topography. More than 4,000 hectares on the Imbo Plain have been developed for irrigation. Drainage and salinity are resource problems in some areas.

## **2. Water Resources**

Except for the Imbo and Moso plains, moisture is not generally a constraint to agricultural production in Burundi. Since rainfall is adequate for crop production in most of Burundi, the management of surface water resources relates primarily to agriculture on the Moso and Imbo plains.

The major bodies of water associated with the plains are the Rusizi river for the northern Imbo plain and the Maragarazi river for the Moso plain. However, the importance of these rivers for irrigated agriculture is limited. In some cases, marshland obstructs access to these rivers. Also, the slope of the plains is steep which results in excessive pumping to access land with river water for irrigation. Consequently, it is the rivers which transect the plain which are important for irrigation. Irrigation is much more developed on the Imbo plain than it is on the Moso plain, where its use is confined mainly to sugar production at present.

## **3. Mineral Resources**

Burundi has both rock phosphate and limestone deposits. The rock phosphate cannot be exploited at acceptable financial costs. It is, however, financially feasible to develop the limestone deposits. In fact, Burundian businessmen are producing burnt lime on the Moso and Imbo Plains. Most of this lime is sold to projects and individuals who use it to neutralize the acidity and reduce the aluminum toxicity of highland soils.

## B. Production, Processing and Marketing of Agricultural Commodities

### 1. Food Crops

Grains, root and tuber crops make up the major food crops in Burundi. Grain crops include grain legumes -- i.e., beans and peas -- and cereal grains -- i.e., maize, sorghum, rice and wheat. Root crops include cassava, sweet potatoes and taro [*colocos*]. The major tuber crop is Irish potatoes. Another important food crop is bananas, including beer bananas and edible bananas.

The benchmark agriculture of Burundi before 1900 was a farming system based on sorghum/legume -- i.e., Bambara groundnuts [*Voandzou*] and cowpeas -- production at elevations between 1,400 and 1,800 meters. This agriculture evolved for nearly 1,000 years without losing its basic character. [Jones and Egli, 1984].

The first crop change during this long period was a gradual shift from bullrush millet [*Setaria typhoidium*] to finger millet [*Eleusine coracana*]. Peas were introduced into the highlands during the 1500s, when sustained contact between sub-Saharan Africa and Europe was initiated. Finger millet and peas were important in the extension of cropping to altitudes above 1,800 meters because of their adaptability to the cool moist conditions at these high altitudes.

Sorghum was introduced later in this period, and became popular as a fermentable grain for making beer. During this century, bananas have gradually replaced sorghum as the main ingredient for beer, though some sorghum is still grown for this purpose.

Changes in Burundian agriculture accelerated during the colonial era at the beginning of this century. Crops that have come to dominate Burundian food production were introduced from the new world and from Asia. New crops included: beans, maize, rice, wheat, sweet potatoes, Irish potatoes, cassava and taro. These crops now dominate food production in the highlands.

Beans replaced cowpeas in the highland agriculture and are now the principal legume at elevations up to 1,800 meters. Above that level, peas [*petit pois*] are better adapted. Institut Statistiques et Etudes Economiques [ISTEEBU] figures suggest that national bean production has averaged slightly above 300,000 metric tons in recent years. Beans serve as an important protein source in rural diets. Pea production has been estimated at about 30,000 metric tons. Production of beans and peas now appears to be declining, as farmers switch to higher yielding root and tuber crops.

Maize became popular in highland agriculture in this century, largely replacing sorghum. Maize can yield more grain [and potential calories] per hectare than sorghum and is better adapted to cool highland conditions. Even so, maize does only moderately well in the highlands, due to infertile acid soils and cool seasons. Current varieties are slow to mature [taking up to 180 days]. Maize production in Burundi appears to be relatively stable at about 175,000 metric tons annually, allowing for interannual variations in weather.

Rice has been grown in Burundi for some time in minor way but production has expanded in recent years. Rice has not traditionally been a popular crop in the highlands. This, however, is changing as farmers increase cultivation of the highland marshes. Irrigated rice is an important crop on the Imbo plain. Production rose through the 1980s to about 28,000 metric tons per year. Indications are that this production is continuing to rise.

Wheat was recently introduced to Burundi, primarily to supply a local flour mill. The mill is now closed and interest in wheat is declining, though some continues to be grown in the highlands as a subsistence food crop. Wheat is not well adapted to Burundi, since it suffers from leaf diseases in low elevation humidity and does poorly on acid soils with aluminum toxicity problems at high elevations. Wheat production averaged about 8,000 metric tons per year in the late 1980s.

The most recent change in Burundian cropping patterns has been a gradual shift from higher quality grains toward root crops with higher gross yields but lower food value. Jones and Egli [1984] describe the process as:

"Caloric value of diet per farm is maintained as farms grow smaller by substituting higher yielding tubers for higher food-quality grains; food crops crowd out cash crops; livestock is reduced to small animals that live on crop and household waste; and emigration is needed to maintain a low-income equilibrium."

The most widely grown root crop is sweet potatoes, particularly at middle altitudes. Sweet potatoes are drought resistant and can be highly productive. It is also a highly versatile crop, both for direct consumption of roots and tops and for processed products. Annual production ranges around 650,000 metric tons. Interest remains high in sweet potatoes, though Irish potatoes may be gradually encroaching on their use at high elevations.

Irish potatoes are increasing rapidly in use above 1,800 meters elevation. This crop can produce high tuber yields in a short time, permitting three crops per year under highland conditions. Potatoes have become a preferred food among highland people, with surplus potatoes easily sold in rural markets. Potatoes suffer from several seed-borne diseases. Recent developments in seed propagation, however, have provided healthy seed that is being increased for planting. Potato production averaged around 40,000 metric tons in the late 1980s. Production is certainly higher now and seems to be rising rapidly.

Cassava -- or manioc -- was introduced by the Belgians following severe droughts and famine in the 1930s. Cassava production has increased rapidly and it now rivals sweet potatoes in annual production. Cassava fits best in lowland areas, where it can grow and produce food on comparatively poor soils. Cassava production was estimated at about 640,000 tonnes in 1989. This has probably increased since, as farmers switch from lower yielding grains to higher yielding root crops.

Taro -- *colocos* -- is increasingly grown as a root crop in mixed cropping patterns. Its ability to grow in shade enables it to fit under tree and shrub crops.

Other food crops include beer bananas, which made up about 70 percent of total banana production in Burundi in the late 1980s, according to ISTEERU figures. The beer banana harvest totaled over one million metric tons each year from 1987 to 1989. Beer bananas are Burundi's biggest crop in both tonnage and hectareage. The fermentation process reduces by about 40 percent the original caloric content of bananas converted to beer. But, despite this loss, beer bananas are an important source of food energy and social enjoyment in Burundi. Between 550,000 and 600,000 tons of edible bananas were also grown.

Industrial food crops include sugar, palm oil, and soybeans. Sugar is grown in the Moso area and oil palms and soybeans are grown on the Imbo plain, with additional plantings of palm oil on the coastal plain south of Bujumbura. None can be considered major crops in hectareage or tonnage.

Sugar production was initiated in the mid-1980s, primarily as an import substitution crop. Sugar production and processing are performed by the government parastatal sugar company [SOSUMO]. This production is financially "profitable" only because imports of sugar are subject to heavy tariffs. Many individual farmers grow a little sugarcane for domestic use.

Palm oil production is expected to rise as young oil palm plantings mature and productive yields increase. Local demand is active for palm oil but world prices are low due to overproduction in many countries. As with sugar, the question is whether Burundian resources could not be better allocated to other uses in the context of a more open import/export trade regime.

Soybeans were recently introduced as a crop that would supply a company in Bujumbura which produces nutritional supplements and health drinks. Soybeans produce well on the plains, but the processor has now found an alternative supply for its operations. Soybeans have not gained acceptance as a substitute food crop in Burundi.

## 2. Traditional Export Crops

There are three major "traditional" export crops in Burundi. Coffee, tea and cotton in that order of importance. The claim of any of them to being traditional is tenuous since the earliest introduction among them -- coffee -- came to Burundi in 1920. In any case, these crops play an important role in Burundi's economy. Each is identified with a different production environment and a different set of problems.

### a. Coffee

Coffee production covers 4 percent of Burundi's cultivated land area and is grown by about 500,000 farmers. Returns over the last decade have been variable as a result of climatic conditions and price. Since 1986, the price trend has been downward. As a result of lower

prices, coffee's domination of Burundian exports fell from 92 percent in 1979 to 80 percent in 1989.

Coffee is identified with the benchmark highland crop production zone. In other words, it is grown in the most densely populated regions of the country. Its major advantage is that it provides access to the cash economy for farmers who would be virtually totally subsistence farmers without this crop. But coffee must be considered a vulnerable crop for two reasons. In recent years prices have been low and it competes directly with food crops which are desperately needed to feed an ever expanding population.

Except for the strictly enforced laws against removal of coffee plants, much of Burundi's coffee production would certainly have already been a casualty of both the increased demand for food crops and lower coffee prices to the farmers. There are two obvious ways of reducing the pressures on the land now used for coffee. The first is to increase the net returns to farmers from producing coffee -- i.e., to increase factor profitabilities in coffee production through intensification. This is so because Burundi is a price-taker in world coffee markets and government manipulation of coffee prices *per se* is a non-viable option even in the short-term.

The second option is to intensify production of food crops. This would mean that increasing levels of food security could be reached -- even at high rates of demographic growth -- by using less land. This would mean that farmers would have more land resources to devote to production of export crops, while still meeting household consumption objectives.

Unfortunately, neither of these options is being fully exploited in Burundi at present. The major alternatives which farmers now have with respect to increasing food production are to increase the land devoted to food crops by taking out their coffee plants and/or reclaiming upland marshes.

Coffee yields vary from 300 to 1,000 kilograms per hectare. Some of this variation is accounted for by differences in land capability but inputs and crop husbandry, including fungicides and pruning, are also important to producing high yields of export quality coffee. Mulching, formerly required and still widely practiced, is also important to coffee production. But aside from mulching, there does not appear to be much enthusiasm among farmers for intensifying coffee production.

In fact, laws intended to increase coffee production -- such as regulations forbidding intercropping with coffee -- may have increased coffee's vulnerability to land competition from food crops. The result of these laws has been to isolate coffee as a unique and, to a certain extent, contrived production activity, rather than integrating it within the basically subsistence farming system in the Burundian highlands.

An effort is now being made to strengthen coffee production in Burundi by focussing production and postharvest handling on maintaining quality; and privatizing marketing. A network of washing and depulping stations has been put in place to improve quality. Privatization of

marketing is supposed to occur in the immediate future.

Burundi can produce high quality coffee at competitive prices. Consequently, major investment in this sector is justified. Liberalization is not likely to obliterate coffee production in Burundi. Rather, its impact will correspond with what would be expected where production of a basically sound commodity has been skewed by government intervention. There will probably be an initial period when coffee production will be reduced -- some estimates put this potential for loss as high as one-half of total yield -- followed by the emergence of a stable, profitable coffee production sector.

#### b. Tea

Tea is a very recent -- 1962 -- introduction into Burundi. By 1990, tea had been established on 6,400 hectares, which is equal to about 7 percent of the land used for coffee production. Tea is produced at altitudes above the benchmark highland production environment and produces well on soils with high enough levels of acidity and aluminum toxicity to be poorly adapted to the production of food crops. For these reasons, tea is not vulnerable to land competition from food crops.

In Burundi, tea was initially produced on industrial plantations. The highest yields are still produced on large plantations, but these plantings account for only 26 percent of the land used for tea production. There are now 60,000 small farmers who are cultivating tea.

Tea is responsive to management. This is especially true of nitrogen application which results in an immediate growth of the young leaves which are plucked as the only commercially exploitable part of the plant. Because of poor price incentives, both industrial and smallholder fields are producing at levels 30 to 40 percent below their yield potential.

Burundi produces high quality tea at competitive prices. There are five tea processing factories in the country, with a sixth plant under construction. Government policies based on input subsidies and low, fixed output prices have been detrimental to the establishment of a stable, profitable tea production sector in Burundi. A project starting in 1987 with major European Community participation attempted to improve efficiency and increase production in Burundi's tea sector. This effort has not dealt with the fundamental problem of insufficient and unfocused incentives.

Under SAL III, tea production and processing are to be liberalized. It is anticipated that the result will be price incentives to produce high quality tea. Input subsidies will be eliminated and the autonomy of the tea factories will be increased. The factories will eventually have the right to sell to private brokers or directly to the Mombasa market, as well as to the Burundi Tea Office.

### c. Cotton

There are a number of similarities between the coffee and tea production sectors in Burundi. These similarities do not extend to cotton. In the first instance, cotton is exported as a finished product -- cloth -- and not as an agricultural commodity. Of equal importance, Burundi does not enjoy any comparative advantage in cotton production. Consequently, this sector entirely owes its existence to government policy and force of law, rather than to any commercial feasibility.

Cotton is produced on 6,600 hectares on the Imbo and Moso plains. It is strongly identified with the regimented production systems of the *paysannats*. Yields are low and vulnerable to the fluctuations in time and quantity of rainfall which characterize the plains. Without the laws favoring its cultivation, cotton production would probably disappear immediately from the Burundian agricultural production scene.

Competition for land is not a problem for cotton production. It is vulnerable because of low price and because it competes directly with a highly profitable cash crop -- tobacco. In spite of the laws mandating its production, the extent of the land used for cotton cultivation declined by 1,000 hectares between 1988 and 1990. Due to political instability during the late autumn planting season in 1991, the 1992 crop will be exceptionally short.

On strictly technical terms, cotton can be justified as a crop which is well-adapted in a rational crop rotation for the plains. It does supply a small but significant local industry, which under SAL III reform agenda is being considered for liberalization. But, continued large-scale cotton production is in our opinion unlikely because cotton as a crop is probably too unprofitable to survive in any open competition with other crops.

### 3. Non-Traditional Export Crops

Other crops which have been exported in significant quantities are: tobacco, rice, foliage plants, cut flowers, fresh produce -- passion fruit, green beans -- and quinine. The total contribution of these crops to the value of Burundian exports is less than 5 percent. In some cases, growth rates are excellent but this is more a function of starting from low baseline production levels than rapid expansion in high volume markets.

Traditional Burundian export crops are characterized as being high value and non-perishable. The emphasis in coffee, tea and cotton is particularly on their non-perishable nature. In the case of cut flowers and fresh produce, important thresholds in both value and perishability are crossed.

Without exception, these crops are identified with the Imbo Plain. The Imbo Plain has three major advantages to offer entrepreneurs interested in exporting agricultural products: good soils, irrigation and proximity to Bujumbura and the international airport.

For tobacco, only the first of these factors is important. For rice, the first two are important. These crops do not represent any fundamental departure from Burundi's traditional export crops.

Rice is a non-perishable low value crop which has enjoyed some recent export activity resulting from political turmoil in a neighboring country.

Tobacco is also a non-perishable export. It bears some similarity to cotton in that it is exported as a finished product -- i.e., cigarettes. But the fact that it is much more profitable for farmers to grow tobacco than it is for them to grow cotton makes these crops direct competitors, with tobacco the clear favorite to completely dominate if farmers are given freedom to allocate their resources.

For very high value crops -- i.e., fresh flowers, fruits and vegetables -- all three factors favoring the Imbo plain are important because of their implications for higher quality and lower risk. The Imbo Plain probably has environmental and technical comparative advantages for the production of high-value horticultural products for the European market. This region represents a high potential agricultural resource.

#### 4. Livestock and Livestock Products

Statistics of livestock and livestock products in Burundi vary widely in the available literature. A recent review of the rural sector [FAO, 1991] reports livestock inventories as: 420,000 cattle, 800,000 goats, 300,000 sheep, 80,000 pigs, 2,200,000 chickens, and 70,000 rabbits. World Bank [1991] statistics for the period 1972 to 1988 report a 43 percent decline in cattle numbers and a 32 percent increase in goats, with the sheep population increasing by 16 percent. The biggest increase in numbers is registered with pigs where the population is estimated to have increased by 360 percent over the period.

Reduced to standard animal units, this implies that the country has approximately 460,000 ruminant animal units. Land use figures in the government's *Politique Sectorielle de l'Agriculture et de l'Elevage* [Ministere de l'Agriculture et de l'Elevage, 1988] show an estimate of 1,402,198 hectares of available "pasture" land. This converts to a maximum availability of approximately 3 hectares of unimproved natural grazing land per ruminant animal unit in Burundi.

This fact, combined with the observation that the cropping systems in place do not appear to generate large quantities of crop residues valuable for animal feeding, leads us to the immediate conclusion that the low productivity observed in the sub-sector is primarily the function of a overall nutritive constraint. That is, animals reared outside a very small number of "modern" livestock enterprises show very low levels of productivity in meat and/or milk because they are on planes of nutrition barely above their maintenance requirements. Under such conditions, animals survive but they do not produce livestock products at acceptable rates.

This being the case, it should come as no surprise that the subsector contributes on average only 4.6 percent of value to GDP and 8 percent to total value in agriculture. Or that, the subsector produced an estimated 16,500 metric tons of milk and 15,150 metric tons of meat in 1990. Or that domestic production is estimated to cover only 6.6 percent of national consumption requirements for milk and 30.3 percent of the meat requirement.

Traditional livestock raising in Burundi appears to be a rural activity for which the peak production years are long since past and for which the future is likely to be a process of long, steady decline. Challenged by increasing population pressures on the land and the spread of cropping enterprises, the traditional extensive grazing systems in Burundi apparently have shown very limited adaptation to the changing situation and have been increasingly relegated to the more marginal lands of the southern plateau -- i.e., Bututsi, Mugamba and Cankuzo -- where seasonal, short distance transhumance between the plateau and the lowlands is still possible.

If current government statistics can be believed, one can detect the classical pattern for a livestock system under severe stress, with the cattle population declining rather rapidly over the last thirty years and being replaced to some extent by small ruminants, particularly goats -- the primary survivor animals on very marginal lands. This system is characterized by low productivity, slow growth and reduced fertility in surviving animals, and very low rate of commercial offtake. So much so that many documents maintain that the primary benefit from stockraising at present is the production of manure for transfer to cropland.

It appears under such conditions that the traditional livestock raising system in Burundi has essentially been reduced to a salvage operation. In such systems, animals are used basically to derive low level production of milk, meat, hides and skins from lands that cannot -- or, in Burundi's case, should not -- be used in any other way.

Most attempts to increase productivity in these systems in Africa have been futile, unless means are found to release the binding nutritive constraint on the animals in a permanent and financially remunerative manner. Programs oriented toward other interventions without nutritive improvements -- i.e., increased veterinary treatments, introduction of exotic genetic materials, provision of waterpoints, etc. -- have been shown throughout Africa to be worse than ineffective. In all instances, they have increased animal numbers beyond the carrying capacity of the rangelands without lasting impacts on productivity within the system and have, thereby, led directly to increased environmental degradation.

In the recent past, virtually all efforts to "assist" the Burundian livestock sector appear to have been concentrated mainly on increased veterinary treatments and on genetic improvement of local animal stocks through either crossbreeding or reliance on importations of exotic breeds. The first intervention, if technically successful, only leads to more animals laboring under the binding nutritive constraint; whereas the second results only in animals with higher genetic potential which cannot be expressed because they are on a maintenance plane of nutrition.

Unfortunately for the hopes expressed in many of the available reports, greater integration of cropping and livestock enterprises in Burundi does not appear to be very promising in terms of significantly increasing ruminant livestock productivities on a broad scale. The farming systems observed do not appear to produce large quantities of byproducts or crop residues which are either palatable or of much nutritive value to livestock. The major export crops -- coffee and tea -- produce no useful residues or byproducts for livestock. Moreover, by the time most other field residues and household wastes would be available for the livestock, they would probably have

lost most of their nutritive value. Ruminants and other animals can be maintained under such conditions but their productivities will not be high enough to provide adequate financial returns for the farm household's efforts and their principal value in the farming system will be as recyclers of bulky wastes. If the principal reason for maintaining animals on farm is manure production, then essentially no efforts to improve productivity per unit are needed to achieve the desired result.

Certain agro-industrial byproducts -- i.e., cottonseed cake, groundnut meal, molasses, and rice bran -- are currently available in Burundi but none are produced in the large quantities needed to support a major livestock industry. Moreover, all of these products are bulky and expensive to transport. This leads to the conclusion the such feeds are probably best used in small dairy and poultry operations located as close to the points of feed availability as possible and close to Bujumbura, the major urban population center, where the greatest effective purchasing power exists for dairy products and meat.

To the extent that a "modern" livestock sector is developing in Burundi, it seems to be centered on or near the Imbo plain and in the Bututsi region. At present, FAO [1991] estimates that 3,000 to 4,000 cattle are being raised under intensive production conditions on both state and private farms in these two areas. During the mission, we also received reports that private entrepreneurs who have purchased land in Bututsi are beginning to use lime in advance of sowing forage crops for livestock feed.

The ISABU *Atelier* Bututsi is engaged in promoting smallholder livestock systems where farmers use a combination of natural pastures and crop residues in rearing of Sahiwal/Ankole crossbred cattle. And, there is a small German sponsored project in Ngozi to introduce crossbred dairy goats for smallholder production of goat cheese. Finally, FACAGRO and ISABU are collaborating to develop a smallholder livestock model which integrates goats with crop enterprises. Experiments to date were evaluated by FAO specialists in 1991 and were judged to be "encouraging but not as economically interesting as those from the integrated cattle model".

With respect to the local hides and skins trade, we again have essentially a salvage operation. Representative of the four principal firms still engaged in the trade reported during the mission that they already had the capacity to collect approximately 95 percent of all available hides and skins in Burundi and that total availability of these products was shrinking with the continuing declines in animal numbers.

Given the continuing decline in world market prices for untanned hides and skins, any increase in Burundian export revenues for these products appears unlikely. To the contrary, the trade's contribution to national accounts is more likely to decline in the future unless ways can be found to increase the domestic value-added of hides and skins through tanning and production of exportable leather goods. In this regard, representatives of the hides and skins professional association have requested that USAID through the BEST project consider financing a feasibility study to determine the prospects for a domestic tanning enterprise and development of a local leather goods industry.

## C. Institutional Factors

### 1. Overview

At the top of the Government of Burundi pyramid of organizations responsible for agriculture is the Ministry of Plan whose head is the Prime Minister. Overall, the Ministry has the prerogative to coordinate and supervise governmental activity; to originate and follow up on the implementation of the National Development Plan; and to energize and coordinate interministerial committees for economic and social development.

Three ministries are responsible for various aspects of Burundian agriculture. Ranked in order of importance they are:

- ◆ MINAGRI;
- ◆ The Ministry for Land Development, Tourism and the Environment [MATE]; and
- ◆ The Ministry of Rural Development and Cottage Industry [MDRA].

MATE was created in 1989 and does not have cabinet rank. It has ill-defined responsibilities in irrigation, marshland [*marais*] development, soil erosion, rural water pollution and agro-forestry, which frequently bring it into conflict with MINAGRI.

MDRA was created out of MINAGRI in 1983 and works on rural water supplies, rural electrification, new and renewable sources of energy, and improvement in rural living conditions. Its functions and responsibilities overlap to some extent with MINAGRI but problems are reported to be less severe than with MATE.

The three ministries do not coordinate well one with the other. MINAGRI, however, is said to coordinate effectively with the Ministry of Plan, while the other two apparently do not.

Another important public institution directly involved in agriculture is the Faculty of Agronomy [FACAGRO] of the University of Burundi whose span of activity includes both education and research.

Beyond these governmental institutions are the powerful agro-industrial public enterprises -- i.e., those for coffee, tea, tobacco and cotton -- which are under the administrative supervision of MINAGRI.

### 2. Ministry of Agriculture and Livestock

The MINAGRI is responsible for major governmental interventions in Burundi agriculture. The Ministry has four major divisions [*Directions*], each headed by a Director General reporting to the Minister. Not shown on the Ministry's organization chart but under ministerial supervision

is Burundi's agricultural research organization -- the *Institut des Sciences Agronomiques du Burundi* [ISABU]. ISABU is headed by a Director General, who is responsible to a Board of Governors [*Conseil d'Administration*] and, through it, to the Minister of Agriculture and Livestock.

The Ministry's budget for fiscal -- i.e., calendar -- year 1992 is just over FBu 9.3 billion, of which FBu 7.3 billion is to be furnished by external donors. Government revenues are to finance FBu 0.7 billion in personnel and operating costs under the expenditures budget [*budget ordinaire*] and FBu 1.3 billion in capital investments [*budget extraordinaire d'investissement*].

The donors, therefore, are expected to finance 78.5 percent of the Ministry's published budget. Donor-funded expatriate salary and benefit costs are not projected or included in the Ministry's budget. The government's financing goes largely to finance personnel costs, meaning MINAGRI is almost wholly dependent on the donors to finance operational expenditures.

### 3. ISABU

Burundi has had an agricultural research organization since 1962 when ISABU was created to take over the functions in Burundi of the *Institut pour l'Etude Agronomique du Congo* [INEAC], the Belgian colonial tropical research institution. Its evolution until recently was slow. The first Burundi researcher joined the staff in 1972. The government made its first budget allocation in 1977. It was only in 1989 that the present program-oriented scheme of organization was adopted, following the recommendations of a USAID-financed International Service for National Agricultural Research [ISNAR] study.

Today, ISABU is organized in three departments: Commodity Research [*Production*], Environment and Farming Systems [*Etudes du Milieu et Systemes de Production*], and Administration and Finance [*Administratif et Financier*]. The Directors of these department report directly to the Director General of ISABU. The organizational units in the Department for Commodity Research are individual and grouped commodity programs and three functional units. In all, they number 17 at present.

The DEMSP groups field research workshops [*Ateliers de Recherche*], intended to bring commodity researchers and farmers together in on-farm research; and resource management functions, such as soils fertility, agroforestry, biometrics, socioeconomic research, integrated livestock/crop research, and small farming systems. Through the Small Farming Systems [SFSR] Project, USAID has assisted the work of the field research workshops, which are still in an experimental stage. The Department of Administration and Finance carries out ISABU's administrative and financial functions and manages its field stations and centers.

No intermediate layers of management exist between the Director of a Department and the individual programs. In principle, this is sound. Nevertheless, while the management and administrative framework is simple and uncluttered, each Director has an extremely wide span of activities to supervise directly.

ISABU manages its work through the use of two documents -- *Fiches Programmes* and *Fiches Operations* -- which are required for each program. The introduction of these devices implemented the recommendations of the 1989 ISNAR report. They originate in the individual programs and constitute their research program and budget requests, respectively.

While ISABU has issued detailed guidance on how to prepare these program and operations forms, program heads appear to have considerable latitude in deciding what to put in them. Some are quite complete, others fairly sketchy. Several projects appear under two programs -- e.g., Socio-Economic and an *Atelier de Recherche*.

A lack of complete confidence in these documents seems implicit in the ISABU portion of the MINAGRI budget, which is organized by provider of funds, not programs. Apparently, ISABU is still not able to do this, despite the programmatic orientation of its internal programming and budget process. A further complication is the fact that this process is geared to a crop year of 1 September to 30 August, rather than the government's fiscal year, which is the calendar year.

Program Committees in each program are designed to provide a forum for consultation both within the program and with interested parties outside the program. A higher level Scientific Commission reporting to the Director General reviews the programs submitted and advises the Director General accordingly. The Commission also has the power to resolve coordination problems among programs at ISABU.

ISABU does research on all crops of consequence grown in Burundi, except tobacco and bananas. The formerly private, now parastatal Burundi Tobacco Company [BTC] conducts any required research on tobacco. Research on bananas is carried out by the regional *Institut de Recherche Agronomique et Zootechnique de la Communauté Economique des Pays des Grands Lacs* [IRAZ]. ISABU is reported to be planning a long term program in banana research.

The crops research program is tilted strongly toward the traditional export crops of coffee, tea and cotton, particularly coffee. The Department of Commodity Research budget proposals for the 1992/1993 crop year show:

- ◆ 42.7 percent of the FBu 390 million projected is to go to coffee, tea and cotton research, with 30 percent being for coffee alone. 43.9 percent of listed donor funding is for these three crops. While the Government of Burundi expects to finance 9.2 percent of the total crops research budget -- but only 6.7 percent of the research budget for coffee, tea and cotton combined.
- ◆ 30.7 percent is programmed for staple food crops, fruits and vegetables and only 28.4 percent of all anticipated donor funding is allocated to these crops. The government is asked to finance 16.7 percent of this portion of the crops research budget from its own resources.

ISABU's total approved budget for fiscal year 1992 is FBu 777.2 million, of which 67.8 percent is to be financed by external donors. This understates by a considerable margin total projected ISABU expenditures since it does not include resident expatriate salary and benefit costs, estimated recently to be on the order of FBu 500 million. If these costs are factored in, 80.4 percent of ISABU's research is paid for by the donors. One recent study placed this percentage as high as 83.4 percent. Further, other costs, such as foreign exchange operating costs incurred by International Agricultural Research Centers [IARCs] in cooperating with ISABU are not included in the ISABU budget.

According to ISABU's official 1992 budget, fifteen donors provide funding and, curiously, seven international agricultural research centers are listed as donors, even though they themselves are financed almost entirely by donor agencies. Belgium is the largest donor, providing 32.6 percent of ISABU's budgetary resources, followed by the World Bank at 13.6 percent and France -- the *Caisse Centrale de Cooperation Economique* [CCCE] and the *Fonds d'Assistance et Cooperation* [FAC] -- at 6.3 percent. Thus, three donors alone finance 52.5 percent of the Institute's budget. The published figures considerably understate Belgium's importance since it provides a considerable number of resident expatriate staff whose foreign exchange salary and benefit costs, as stated above, are not carried in the budget. This is true of other donors as well, including USAID.

The fragility of ISABU's financial situation demonstrates not only the heavy, potentially dangerous dependence on foreign donors but also the apparent unwillingness of the government to commit itself to agricultural research in any meaningful way. One clear consequence has been -- and will continue to be -- a situation in which donor priorities determine what research will be done, not those of the host country. Baldly stated, without the donors, agricultural research in Burundi would cease.

Unless Burundi chooses in real terms to make a major investment in agricultural research, it cannot reasonably expect to field a coherent program of its own concept and design. Research will continue to be fragmented, compartmentalized and, in the end, driven by donor imperatives, not those of Burundi. Important donor interest now bends the thrust of ISABU's research toward traditional export crops and away from food crops, even though the country very soon may be entering a period when the most urgent need will be for food production not to fall behind the rapid growth in population.

The basic weakness of ISABU is dramatically demonstrated in the skewing of its scientific staff toward expatriates. Thirty years after its creation, ISABU has only one Burundian scientist holding a doctoral degree, while nineteen expatriates with doctorates are on the staff. The situation is somewhat better in the case of *ingenieurs agronomes*. In February 1991, there were 37 Burundians as against 21 expatriates with the same qualifications.

ISABU benefits technically and financially from cooperation with bilateral donor and regional and international research networks and organizations. Among the bilateral institutions are the French *Institut de Recherche de Cafe et de Cacao* [IRCC] and the *Institut de Recherche*

Agronomique Tropicale [IRAT].

The IARCs and their associated networks play a significant role in ISABU's research activity. They broaden and deepen the effectiveness of Burundian agricultural research at relatively little cost to Burundi and the donors. Their purpose is to strengthen national agricultural research and institutions and to promote regional and international cooperation in agricultural research. They bring to bear expertise from an international cadre of experts, not associated with the interests of any bilateral donor.

Three are currently very active in ISABU research programs. First, the International Potato Center [CIP] through the Programme Regional pour l'Amelioration de la Pomme de Terre en l'Afrique Centrale et de l'Est [PRAPACE] has had personnel based in Burundi since 1983 and has been quite successful in bringing about the introduction and adoption of disease resistant varieties. Through the SFSR project, USAID has helped finance local costs of this effort. CIP, with the recent addition of sweet potatoes to its mandate, has begun work on that crop.

Second, the International Council for Research in Agroforestry [ICRAF] through the Agroforestry Research Networks for Africa [AFRENA] has had a scientist stationed in Burundi since 1988 working on, among other things, planting of grasses and shrubs on bunds and intercropping of trees and bananas.

Third, the Centro Internacional de Agricultura Tropical [CIAT] has been active in bean research in Burundi since 1983 when it stationed a scientist in the country. In 1986, a regional bean network organized by Burundi, Rwanda, Uganda and Zaire came into operation. This network, the Programme Regional d'Evaluation des Ligneas Avancees en Afrique Centrale [PRELAAC], Burundi's [ISABU's] role in the network is to screen for disease and stress. The three other participating countries conduct research in other mutually agreed upon areas of research. Presently, CIAT has a breeder, pathologist and anthropologist based at Butare in Rwanda to serve the network.

Other IARC networks cooperating with ISABU have been:

- ◆ The International Institute of Tropical Agriculture [IITA] East and Southern African Rootcrop Research Network [ESARRN] in cassava;
- ◆ The International Maize and Wheat Improvement Center [CIMMYT] in maize;
- ◆ The International Livestock Centre for Africa [ILCA] in supplements to crop residues; and
- ◆ The International Crops Research Institute for the Semi-Arid Tropics [ICRISAT] and Semi-Arid Food Grain Research and Development [SAFGRAD] East Africa Research on Sorghum and Millet [EARSAM] in sorghum.

- ◆ The International Board for Soils Research and Management [IBSRAM], through the research network AFRICALAND, in analyzing residues to improve soil fertility;
- ◆ The International Fertilizer Development Center [IFDC] in assessing the use of rock phosphate.

#### 4. FACAGRO

The Faculte des Sciences Agronomique du Burundi [FACAGRO] has been in existence in Burundi since late 1960 but only since 1976 has it enrolled candidates for *ingenieurs agronomes*. Through 1990, FACAGRO had graduated 174 *ingenieurs agronomes*. During the current academic year, 105 students are attending the three year course of instruction provided by FACAGRO. In September 1992, FACAGRO intends to introduce courses of study leading to the award of a *Doctorat de Troisieme Cycle* [equivalent to an American Master of Science degree].

FACAGRO performs research, some in collaboration with ISABU. This is true in the cases of small ruminants, high altitude rice, and the *Fertilisation des Agrosystemes Vivriers d'Altitude* [FAVA] project.

The *Centre Universitaire de Recherche Developpement en Agronomie* [CERDA], attached to FACAGRO, was created in 1990 to provide to clients on a contract basis data bases for development projects; carry out nutrition and food studies; make household surveys; and participate in the definition of socio-economic development plans.

#### 5. IRAZ

IRAZ is a regional research organization of the countries of the Great Lakes -- i.e., Burundi, Rwanda and Zaire -- with its headquarters at Gitega. It has a very broad charter enabling it to do just about anything in agricultural research it wants to. It can both initiate research and do research in collaboration with research institutions in the member states.

IRAZ is responsible for carrying out Burundi's banana research program in cooperation with the International Network for the Improvement of Bananas and Plantain [INIBAP]. A representative of IRAZ sits on the Executive Committee of PRELAAC. IRAZ is actively supported by the International Development Research Centre [IDRC], the *Fonds Europeens du Developpement* [FED], and the United Nations Development Program [UNDP] -- the latter two having funded the construction and equipping of IRAZ's new headquarters near Gitega. A joint GOB/FAO report in 1991 was very critical of IRAZ's performance but noted it had been successful as a center of documentation.

PRAPACE and AFRENA provide training in-country, in the region, and outside Africa. They also are the vehicles for exchange of information through reports and other publications, workshops and seminars, and the provision of genetic materials.

#### **D. Socio-Economic Factors**

The mission team since arriving in Burundi has been inundated by a veritable blizzard of reports, memoranda and miscellaneous scraps of paper purporting to deal with socio-economic aspects of Burundian life. It is perhaps unkind but we feel constrained to observe that the sheer weight of these documents is greatly disproportionate to their factual content. We have plowed through endless pages searching rather desperately for evidence that the many speculations, opinions and declarations contained therein have a factual basis in actual, comprehensive farm and/or rural household interview/survey work conducted with large enough samples at frequent intervals over periods long enough to arrive at statistically verifiable conclusions. And, unfortunately, we have yet to find many documents that meet these simple criteria for either scientific method or old fashioned honesty.

The inevitable result of the present situation, so aptly described by Wolfgang Stolper as "planning without facts", is that everything is a priority and consequently nothing is a priority. Analysis of the situation facing rural households in Burundi simply cannot be done without credible cross-sectional and time-series data on a representative sample of those households. And, this is particularly true in a situation where the most salient characteristic of both the household and natural environments is their variability.

As one small example of the variability of rural household situations, we can refer to data collected in the Buyenzi SRD and reported by Bergen [1988]. In these data from over 500 households, the size of farm holdings ranges from less than 20 ares to over 150 ares, with the median holding being approximately 35 ares. [Note: 100 ares equal one hectare]. Within the same sample, the number of active workers per farm averages 3.1 persons, with a range of only 2.5 to 4.1 persons. This implies that total farm size in the sample area at least is only weakly correlated with the size of the farm labor force. In such a situation, it would appear risky in the extreme to generalize about either the size, distribution or ultimate uses of intrahousehold income flows, much less about the who does or does not participate in household decision-making.

What might be said on the basis of these data -- and those from a few other reports -- is that farm size in Burundi may average 0.8 hectares but this figure is largely meaningless given a range of sizes from less than 0.2 hectares to 10 or more. Moreover, speculation as to how rural households make allocatory decisions among family members and with respect to the resources they command is very risky if one has no quantitative data on input and output flows and values from agricultural enterprises and/or from other sources and precise ideas of the variability around each of the parameters commonly cited.

All this is by way of saying that the lack of reliable data appears to us to be the most binding constraint in developing a rational hierarchy of priorities to be addressed by development assistance in Burundi. In the absence of pre-existing data sets, one has two fundamental choices. One can opt for a lengthy process of data collection and diagnostic surveys prior mounting any effort -- the luxury of time permitting -- or one can make calculated guesses as to what are the priority interventions most likely to have major impacts of a smallholder farming situation and

simultaneously commit resources to monitoring and evaluating the interventions in continuous collaboration with the population affected by those interventions.

The latter course is the one used by persons in the agricultural economy in Burundi every day of their lives. Our field observations and interviews have led us to the conclusion that most farm households, faced with the reality of limited access to new technologies and inputs for their farming systems, have chosen to manage their available resources -- chiefly land and family labor -- under a conscious risk spreading strategy. That appears to be why one observes so many different crops being planted over space and time during the agricultural year. It also explains -- for us at least -- the evident absence of specialization on the majority of farms observed. And, the absence of specialization in large part explains the low level of marketed commodity flows within and between the different regions in Burundi. This is so because, if all farms produce essentially the same range of outputs, marketed flows are reduced to those residual amounts needed to balance out minor surpluses and shortfalls across a spectrum of similar farming operations -- and to feed the small percentage of the Burundian population that is not directly engaged in agricultural production activities.

In a situation where yields are essentially stagnant -- and in some cases actually declining -- and the option of increasing production by expansion of crop enterprises onto to new land is increasingly non-viable, farm households are left with few choices. The major on-farm one is to reduce resource allocations to non-food "cash" crops to the absolute minimum needed to generate cash flows commensurate with household needs and to allocate the remaining resources to crops that produce the maximum caloric outputs per unit of available land. The other, short of migration out of agriculture entirely, is to diversify family labor resources out of direct on-farm crop production activities and into other income generating activities on the farm and in the wide rural economy.

We believe that this is why existing aggregate statistics on agricultural production -- deficient as they may be -- appear to show order of magnitude shifts out of beans and maize and into cassava, sweet potatoes, bananas and, to a lesser extent, rice. It may also explain the anomaly of aggregate food production appearing to increase at roughly the same rate as demographic growth, while the composition of rural diets seem to be deteriorating.

Unfortunately, while resort to changes in cropping patterns to meet household consumption needs may be a successful strategy in the short-term, such a strategy will inevitably be futile over the medium and long-term. This, we believe, is the fundamental fallacy underlying the current hypothesis that Burundi can concentrate all its development effort and investment on export crops and essentially ignore the needs of food crop enterprises. Simply put, people in Burundi cannot survive and prosper over time on banana beer and starchy staples alone. In the absence of a constant flow of new agricultural technologies and more access to a broader range of agriculture inputs, the rural household's need to generate more food and better balance in dietary intakes will come to the fore and sheer survival needs will supersede the cash revenue objective from export crops.

Given the increasingly limited prospects for further expansion of crop enterprises onto new land, any increases in Burundian capacity to produce export crops will be a function to two factors: increasing production of export crops in areas already planted and/or increasing the quantity and productivity of factors employed in food crop production. There appears to be a great deal of donor support directed toward the first factor, particularly for coffee, tea and cotton; while food crops are largely left to the farmers' own devices.

Currently, there is also a great bias in donor support toward improving post-harvest processing and marketing of the traditional export crops. Virtually every major external donor agency except USAID is devoting a major portion of its total program support to improving the quality of Burundi's traditional and non-traditional exports, facilitating activities which generate more domestic value-added, and/or finding higher value niche marketing outlets for these exports.

We have no fundamental disagreement with the objectives underlying these efforts but we do have serious questions about the lack of balance in total donor assistance between export and food crops and between downstream support for agro-industrial processing and marketing and upstream support for development of new technology and improving farmer access to inputs through permanent and private distribution systems. The major risk in this approach is that the downstream possibilities for improvement in export crop processing and marketing may be exhausted rather quickly without having any significant impacts on the more fundamental problem of stagnation in upstream crop production.

In the medium-term, we believe that major improvements in the Burundian agricultural economy must be generated from a continuous flow of innovations in agricultural production techniques and from increasing farmer access to agricultural inputs through a gender-neutral permanent and private sector system for input distribution. We fear that the present donor policy of putting an overwhelming proportion of resources into downstream elements of the total production/processing/marketing chains will rather quickly be reduced to an exercise of tinkering at the margins while more fundamental problems go unaddressed.

## **v. IDENTIFICATION OF CROPS/PRODUCTS WITH EXPORT POTENTIAL FOR CONSIDERATION IN THE USAID DEVELOPMENT STRATEGY**

### **A. Traditional Export Crops**

The "traditional" export crops -- coffee, tea and cotton -- have been and will continue to be very important factors in Burundi's economic prospects. Coffee and tea are exported as semi-processed commodities, whereas cotton is exported as finished products -- i.e., textiles.

#### **1. Coffee**

Coffee is by far the most important of these three crops. Burundi has been shown to have a competitive advantage in the production of high quality coffee. But, unfortunately, Burundi's coffee production may decline in the future because of increased competition for land from food crops and declining prices for the commodity.

The direct relationship on Burundi's central plateau between intensifying food crop production and the viability of coffee cultivation is not adequately appreciated. Under current circumstances, coffee cultivation is squarely in the path of increased food crop production. Coffee already has price problems. If both the subsistence needs and the price of food crops increases, downward pressure on the extent of land devoted to coffee production will become much stronger. If this century has any one emphatic lesson to teach about Burundian highland farmers, it is that they are quick to change their mix of crops if conditions warrant such a shift.

In a period of depressed export prices for almost all grades of coffee and apparently permanent changes in consumer preferences, it will be increasingly difficult to offer farmers higher farmgate prices for their coffee cherries -- and, thus, real prices received for coffee are likely to fall over the next decade. Efforts to increase domestic value-added by moving to export of fully washed coffee may mitigate some of the effects of the adverse trend in prices and preferences in world markets in the medium-term.

This effort, however, continues to be well supported by donors other than USAID and has received a very large portion of available donor investments over, at least, the last twenty years. We see no pressing need or particular role for USAID resources being devoted to this activity.

The recent USAID-financed effort to bring local coffee exporters into contact with major coffee importers in the United States and Sweden and to promote Burundian coffee at a San Francisco fancy food show may have positive results if the participants follow up on their initial contacts. We would encourage members of the BEST project to ensure that there are necessary follow up efforts in the short-term.

However, it should be remembered that so-called "niche" or "*boutique*" markets are characterized as such precisely because market participants make their money moving small quantities of specialty products at high prices to elite consumer groups.

Unfortunately, coffee is not a perishable commodity in the normal sense of the word. This means that prices for specialty coffee in niche markets are inversely correlated with marketed quantities of the coffee and directly correlated with the level of advertising expended on the product.

If a coffee exporter selling into such a market suddenly tries to significantly increase the quantity of the product marketed, prices are likely to decline precipitously. High prices in a niche market can only be maintained if the seller can somehow convince consumers that the product being offered possesses some distinctive quality not found in competing products and that the supply of the commodity is limited.

Simply put, this means that, under niche marketing conditions, Burundi can probably receive high prices for small quantities of coffee marketed or lower prices for larger quantities of coffee marketed; but it is highly unlikely that Burundi can market large quantities of coffee at uniformly high prices.

## 2. Tea

Tea is currently in the strongest position among Burundi's traditional export crops. This is so because Burundi enjoys a comparative advantage in tea production and because tea as a crop enjoys technical advantages over other crops in its production environment. The tea sector, however, is well funded by European donors and we see no reason for supplementary USAID investments for this crop.

## 3. Cotton

Cotton is the most vulnerable of these three crops. Burundi does not have a comparative advantage in cotton production and cotton does not have a comparative advantage over other crops in its production environment. Financially, cotton is probably vulnerable to competition from a wide range of food crops. Cotton is definitely very vulnerable to competition from an alternative export crop -- tobacco.

### B. Non-Traditional Export Crops for Niche Markets

Burundi established an export promotion policy in 1988. Since then, financial incentives and devaluation of the Burundian Franc have encouraged the Burundian business community to become involved in export activities. Diversification of exports is an important objective in the GOB's agricultural strategy.

In all cases where alternative export crops have been tested, results have been modest. In most cases, potential is modest as well. The crops considered here are: tobacco, "organic crops",

essential oils and medicinal plants, fresh produce -- passion fruit and green beans -- and flowers. These crops are analyzed on the basis of potential and current activity.

Objectivity has often been an unintended casualty of the search for non-traditional export crops. Typically a feasibility report for a non-traditional crop or group of crops is narrow in scope and has a bias towards a positive conclusion. Usually the small-volume market is not given adequate attention. As a result, positive results are reported when best case scenarios show inconsequential impacts on Burundi's exports. Among the non-traditional export crops which have been considered or are being produced, only tobacco, fresh produce and flowers/foilage plants show promise of making a significant positive impact on Burundi's exports.

Enthusiasm for "niche" crops is especially ill-advised. There is not a precise definition of "niche" in this context. However, these crops do share some general characteristics. Prices are high. Volumes are low. Markets are fragmented and dispersed. Demand often relates to a fad or to a new, highly-specialized trend. Investors are lured by the high value of the commodity. Production generates an increased appreciation for the direct relationship between low volume production and high cost per unit produced. At best, financial expectations are scaled down. At worst, the identification of niche crops with financial disaster is reinforced.

Winter production of fresh produce, cut flowers, and ornamental foliage plants may be small volume compared to coffee and tea but they are not niche crops. These products feed into proven, long-term demand within the high-volume European market. The competition is intense and standards are high but the market is certain to be there for the entrepreneur with the resources and skills to compete.

There are instances -- e.g., essential oils/medicinal plants and organic coffee -- where individuals or institutions have shown initiative in investigating the potential of these crops for profitable production in Burundi. Investing small amounts of money in encouraging this initiative is alright as long as the "venture capital" nature of the activity is clearly understood. Investing time or money in a search for panacea export crops is a waste of available resources.

Tobacco has already proven that it is a profitable crop in Burundi. Farmers, especially on the Imbo plain, have an established record of interest and skill in growing tobacco. If artificial, legal constraints on tobacco cultivation are released and the industry is once again returned to private ownership, production will probably increase.

Flowers and fresh produce require much higher levels of technical and business skills than traditional Burundian exports. They can also be highly profitable. Burundi's competitive advantage for export of fresh horticultural products probably represents its only unexploited agricultural industry with significant potential. But, this is not to say that large-scale development of this resource is likely to occur any time in this decade.

At the risk of oversimplification, the point must be emphatically made that marketing of highly perishable commodities is built around personal contacts and levels of trust and confidence found

in few other businesses. If the potential of this sector is going to be exploited, Burundian entrepreneurs are going to have to be willing to start small and systematically build the contacts and performance record required to generate the profits which this sector is capable of delivering.

### **C. Livestock and Livestock Products**

Given the review of problems and constraints in the livestock sub-sector in Section IV, the team does not believe there are any viable prospects for direct USAID investments in this area over the medium-term. Modest efforts are already under through a variety of Belgium, German and European Community sponsored projects and there is evidence that some private entrepreneurs are active in the field.

With regard to the pending request for assistance with a tannery feasibility study, we feel that it might be desirable for USAID to contribute such an activity under the existing BEST mechanism if -- and only if -- the four firms involved in the trade demonstrate a willingness to fund a significant portion of the local costs for the study. Having listened to the association's presentation during the mission, we have reasonable doubts as to the willingness of the involved firms to actually pool their resources and collaborate in any new tannery enterprise should one be shown to be feasible. A USAID requirement for a private sector contribution in a feasibility study would helpful in removing some of these doubts.

## **VI. IDENTIFICATION OF PROJECT-LEVEL ACTIVITIES OF POTENTIAL RELEVANCE TO THE USAID DEVELOPMENT STRATEGY**

### **A. Input Supply and Distribution**

Modernization of agriculture is driven in the first instance by increasing farmer access to improved technologies and new inputs. Of course, an enabling environment is a necessary but not sufficient condition for increasing agricultural production and factor productivities. Most of Burundian agriculture presently operates at a very low level equilibrium because of the absence of the minimal range of inputs required to improve crop yields -- i.e., seeds and fertilizers.

Input supply and distribution represents one of the few investment opportunities in Burundi which has substantial proven markets, as well as excellent potential for high volume growth. Subsistence farmers in Kirimiro, as well as tea and coffee growers, constitute a guaranteed market for fertilizers and pesticides. This represents a low risk point of entry into a larger market. It is clear that the demand for good quality potato seed also constitutes a lucrative, low risk business opportunity. Maize seed should also be profitable and represents a solid business venture with international participation.

Input supply and distribution represents the commercial activity with the largest growth potential in Burundi. The guaranteed markets should only serve as a point of departure for reaching the vast majority of Burundian farmers who do not make any use of agricultural inputs. In a low level, no input production equilibrium, such as that found throughout most of Burundi, it is often the case that a minimal investment in seed, fertilizer and pesticides will double the productivity of a farm household's land and labor.

Developing and tapping the market for agricultural inputs among Burundi's subsistence farmers will require attention to assembling and promoting packages of practices, which will mitigate all of the major limiting factors. If one of these inputs is neglected, the farmer will not see any return on his investment. If the inputs are properly marketed, farmers will see dramatic returns on their investment and businessmen will have a profitable expanding businesses.

A major limiting factor for agricultural production on many of Burundi's soils is high acidity/aluminum toxicity. The soil amendment which neutralizes this problem is lime. Burundi is fortunate to have limestone deposits which can be -- and are being -- used for this purpose. Lime will be a necessary component in most production packages. The fact that lime is readily available at a reasonable cost is an important advantage for entrepreneurs interested in demonstrating the efficacy of their products to farmers. On the other hand, commercial activity promoting agricultural inputs will give a major boost to the efforts of local private entrepreneurs who are interested in developing Burundi's limestone deposits.

Opportunities for privatization in seed are described in Annex 1 on seed. This presentation recommends two distinct approaches depending on the crop. For hybrid corn and sorghum seed, we suggest the involvement of a seed company that already produces and sells hybrid seeds. Such a company could be invited to come into Burundi to set up a sales and distribution system for improved hybrid seeds adapted to Burundi.

For potatoes and beans, we suggest a different approach. For these crops, we suggest expansion of the roles of the 700 or so contract growers who already produce potato and bean seed for the National Seed Service of Burundi. These seed growers provide a substantial base of private entrepreneurs who already grow and sell seed in several regions in Burundi.

Many of these growers participate in one of several newly-developed seed grower associations. At present, these associations do not play a role in marketing. However, this may be a natural development as the seed market matures in Burundi and the demand for improved seed grows.

Fertilizer use in Burundi has grown in recent years. This should expand rapidly as improved seeds and lime come into wider use.

An input package of lime, fertilizer and improved seeds fits naturally together. The adoption of all three is a must for success on Burundi farms. Even the best seed will do poorly without fertilizer. And, fertilizer responses will not be profitable without lime. Pesticides may also be needed on some -- but not all -- crops.

Farmers who put these inputs together can achieve dramatic responses, sometimes doubling their yields. Such increases in food production are profitable for individual farmers. They are also essential for Burundi, as it struggles to feed more people on the same land resources, while maintaining a cash crop capability.

We see strong opportunities for investment returns from a private input supply industry that can develop and provide fertilizers, lime, improved seeds and, where needed, pesticides to farmers. Built-in markets already exist for coffee producers. Other markets include the regional projects, which now distribute these inputs to farmers directly.

One source of potential private dealers may be the local seed growers who are now developing as seed sellers. Sellers of improved seeds should have strong interest in encouraging the use of fertilizer and lime, since improved seed will need these inputs to achieve high yields. Some or many of these dealers might be interested in selling those inputs that will complement their seed and help it perform better.

The expanding market for crop inputs may offer more potential than any other for investment returns in Burundi. If Burundi agriculture is to move forward it must combine the inputs of lime, fertilizer and improved seed. We have seen enough promise and farmer interest in progress to believe that substantial increases are possible in food crop production. Improvements will require large increases in crop inputs.

Crop inputs are probably the largest market available for expansion in Burundi. The market exists and it is here [not in Europe or other far-away places]. It can improve the food supply and lives of all Burundians. This market awaits development and returns can reward those who participate successfully in developing its components.

By encouraging private entrepreneurial activity in input supply and distribution, the USAID strategy can directly address the problem of the low-level equilibrium in Burundian agricultural production. The effect will be to generate broad-based and equity benefits, while at the same time initiating positive feedback which would encourage further entrepreneurial activity.

## **B. Privatization of Public Enterprises**

Since 1986, much has been written about the need for and the methods by which GOB divestiture of public holdings in a range of enterprises will occur. To date, progress toward divestiture has been slower than originally anticipated by the World Bank and other major donors. But, it appears that the GOB and the donor community have learned valuable lessons over the last five years about both the importance of privatization to any modernization of the economy and the technical difficulties and vested interests which have blocked greater progress.

The program and calendar of reforms for public enterprises over the period 1991 to 1994 being negotiated at present for the SAL III appears to us to be both better formulated and more tied to realistic schedules than any of the predecessor programs. Under this proposal, public enterprise reforms would take place under three rubrics:

- ◆ The rehabilitation of public enterprises considered to be strategic because they provide goods and services of critical interest to the public;
- ◆ The outright liquidation of public enterprises not considered to be either financially viable, capable of becoming viable, or strategic; and
- ◆ The privatization of public enterprises deemed to be non-strategic and financially viable at present or capable of being viable under private ownership and/or management. [Note: Privatization of public enterprises is further broken down into enterprises for which the management will be privatized; enterprises where 51 percent of capital holdings will be privatized; and enterprises where 100 percent of holdings will be privatized.]

At present, 86 public enterprises are on the list for rehabilitation, privatization or liquidation -- of which 60 have already in grouped under the above categories and the future of 26 remain to be negotiated. Under proposed terms for the SAL III, the following enterprises, which are directly or indirectly dependent on the agricultural economy, are scheduled to be effected by the privatization program between 1991 and 1994:

- ◆ For privatization of capital holdings: the *Societe Industrielle et Agricole de la Ruzizi* [RUZIZI], the *Societe d'Exploitation du Quinquina* [SOKINABU], the *Laiterie Centrale de Bujumbura* [LCB], the *Complexe Textile de Bujumbura* [COTEBU], the *Fabrication et Distribution d'Insecticides* [FADI], the *Aliments Composes Vitaminises* [ALCOVIT], the Burundi Tobacco Company [BTC], the *Huilerie de Palme du Burundi* [HPB], the *Verrerie du Burundi* [VERRUNDI], the *Brasserie de Gitega* [BRAGITA], the *Brasserie et Limonader du Burundi* [BRARUDI], and the *Usine de Produits en Coton* [UPC].
- ◆ For privatization of management: the *Office du Cafe du Burundi* [OCIBU], the *Societe Sucriere du Moso* [SOSUMC], COTEBU and COGERCO.
- ◆ For liquidation: the *Office National de Mecanisation Agricole* [ONAMA] and the *Office Pharmaceutique Veterinaire* [OPHAVET].

Among the 26 public enterprises whose fate is yet to be determined are, at least, 12 agricultural and agro-industrial enterprises, including four major government projects [Bututsi, Cankuzo, CVHA and Rutana] and seven *Societes Regionaux de Developpement* [SRDs] in Buyenzi, Buragane, Bweru, Imbo, Kirimiro, Kirundo and Rumonge.

The consulting mission believes that significant progress with respect to privatization and liquidation of the public enterprises listed above is absolutely critical to realistic prospects for development of private sector participation in the agricultural economy. In addition, we feel that USAID should formulate its medium-term strategy so as to position itself as a player in the parallel process of rehabilitation of public enterprises which the GOB deems strategic. The principal USAID role in this regard should be in advising GOB decision-makers as to what roles and responsibilities these strategic enterprises should be allowed to retain and which would be antithetical and/or pose unfair obstacles with private entrepreneurs providing similar goods and services in Burundi.

- ◆ Given the formidable medium-term agenda for ownership and institutional changes in public enterprises and the fact that USAID is already participating to some limited extent in the process through the BEPP and BEST mechanisms, we strongly recommend that the Mission seek to broaden this role over the medium-term.

Since USAID is considered by the GOB to be in an enviable neutral position vis-a-vis the conflicting interests and difficult problems surrounding the privatization of several agricultural and agro-industrial enterprises and has already been invited to provide direction and technical assistance in the process for several key enterprises, we see the assumption of this role for one or more enterprises as critical to the prospects for the overall medium-term USAID strategy linked to greater private sector participation in the agricultural economy.

### **C. Export Promotion Activities**

From the available literature and our interviews, it is obvious that a great deal of time and effort are being devoted to activities aimed at:

- ◆ Increasing the intrinsic value of Burundian export commodities -- i.e., exporting fully washed coffee, improving the quality of tea through more selective harvesting methods;
- ◆ Prospecting potential niche markets for traditional Burundian export products;
- ◆ Assisting newly-organized local commodity associations and university researchers in evaluating the technical and financial options for non-traditional export commodities;
- ◆ Investigating the possibilities for institutional and legal changes to open up and/or support increased private participation in the export trade.

USAID is already participating in the effort to strengthen and expand the Burundian export sector, primarily through the BEPP/BEST mechanism. In addition, several of the other donors -- both multilateral and bilateral -- are also providing both technical assistance and investment under this general rubric.

The World Bank has been engaged for almost 20 years in various aspects of coffee production and marketing. Emphases at present include: opening up the export coffee trade to private entrepreneurs through a domestic coffee auction system; and financing improved technologies and infrastructure to add value to the coffee exported.

The European Community, through FED, is supporting a number of export promotion endeavours. Examples of this assistance include: support to improving product quality in the tea industry; provision of production and marketing expertise for the nascent fruit and vegetable growers' association; assisting faculty at the University of Burundi in investigating the technical and commercial potential of various essential oils and other specialty commodities; and providing cold storage facilities at the airport.

Bilateral donors are also supporting much of the research being conducted on the traditional and non-traditional export [Belgium and France] and in providing the bulk of agricultural inputs used on these crops [Belgium, France, Japan, Germany, etc.].

In general, then, we conclude that export promotion activities, broadly defined, are already being well covered by a broad spectrum of donors. So much so that there appears to be a significant imbalance between the resources being devoted in this area and those being directed at the equally important task of maintaining and/or expanding production and factor productivities in the food crop sector. And, in this regard, there is a considerable variance between the declared intentions of the GOB for a more balanced approach to the entire agricultural economy and the donors' preoccupations with export crops within this economy.

In sum, then, we have no significant quarrel with the general premise that Burundi must strive to maximize returns -- particularly foreign exchange earnings -- from feasible agricultural export enterprises over time as a component in any overall economic strategy for development. We do, however, have serious doubts about the corollary assumption that the Burundian economy can derive sufficient returns exclusively from a export-driven growth strategy to satisfy all the growth and equity considerations of the growing population.

While we support the efforts underway through the BEPP/BEST mechanism to encourage growth in the value and diversification in the mix of Burundian export products as a necessary component in an overall development strategy, we also would caution that the actual gains that can ultimately be realized may turn out to be rather modest in absolute terms and rather narrowly based with respect to local participation. This tentative observation, we believe, is particularly true with respect to the development of new niche market opportunities for the range of specialty minor crops presently under consideration.

#### **D. Support for Public Agencies in Support of Modern Agriculture**

Burundi's population will continue to increase at a rate of more than 3 percent per year given the current demographic structure, unless an adverse disease situation makes significant inroads among the rural people. So far, domestic food production has more or less kept pace with demographic growth through expansion of the area under cultivation and through shifts in cropping patterns from grains to high calorie, carbohydrate crops. But a severe price has been paid in the deterioration in the environment, the conversion of pasture, the expansion of food production into marginal lands and on steeper slopes, and probable deterioration in the nutritional quality of rural household diets. While opinions differ, it is doubtful whether the future expansion of food production to lands not now farmed can continue unabated for very much longer. A more likely scenario is that food crops will begin to displace the traditional export crops in areas where food security is reduced.

How then to increase food production so as to keep pace with demographic growth when 90 percent of the population is already directly engaged in farming and putting new land under cultivation is not a practical option. The answer clearly lies in intensification of food crop production, while preventing further deterioration of the environment.

One way to bring this about is to concentrate agricultural research on selected food crops in order to achieve higher productivity on existing lands. The GOB commits very little of its own resources to agricultural research generally. The largest donors in their assistance to research -- i.e., the World Bank, Belgium and France -- tilt toward export crop research. Whether the government or these donors are responsible for this imbalance can be argued but the heavy dependence on donors to finance agricultural research may well be the controlling factor.

Fortunately, USAID has weighed in on the side of food crops research in its SFSR project. What can the Agency most usefully do now to help expand food crop research without adding measurably to Burundi's dependence on foreign assistance and at the same time encourage

Burundi to increase its own commitment to research.

The key may lie in building on Burundi's present very active participation in two regional networks supported by their cooperating international agricultural research centers -- i.e., PRAPACE and CIP in potatoes; PRELAAC and CIAT in beans; and AFRENA and ICRAF in agroforestry. CIP and ICRAF scientists are resident in Burundi to assist in carrying out Burundi's share of network programs. Burundi benefits not only from the research done in Burundi but also in the other countries of the networks. Through the SFSR project, USAID has funded local costs of the PRAPACE/CIP effort in the country, while AID [central funding] and IDRC have assisted the AFRENA/ICRAF effort. In addition, AID centrally controlled funds are financing the seconding of a land tenure specialist to ICRAF, who will assist AFRENA in Burundi as needed over the next 18 months.

The other IARCs, who have been or are now cooperating with Burundi -- i.e., CIMMYT, IBSRAM, IITA, ILCA, IFDC and ICRISAT -- have made contributions but their participation in research on maize, cassava, livestock, soil fertility, and sorghum has been on a more modest scale. Except for IFDC and ILCA, they are also facilitators/coordinators of regional networks.

Through the networks, most IARCs are staffed and equipped to:

- ◆ Provide material, information and advice on crop improvement, crop protection, farming systems, nutrition etc.;
- ◆ Organize and run training programs, particularly at the technician level, either in country, at a regional site, or at center headquarters;
- ◆ Second scientific staff to a cooperating country, either on a short or long-term basis to assist in host country research which is part of a regional program; and
- ◆ Help organize and participate actively in regional workshops and seminars.

In all their activities, the IARCs expect to work closely with national agricultural research institutions [NARs]. One of their prime goals is to strengthen NARs directly and through regional networks.

Financing of IARC operations comes from two sources:

- ◆ Contributions of donors to meet general personnel and operating costs, often referred to as the centers' "core budgets"; and
- ◆ Donor funding of specific projects or activities, known as "special projects". Most, though not all, scientists are financed out of core budgets. In the case of the United States, AID contributes annually to the core budgets of most IARCs from a centrally managed line item. AID-assisted projects are funded by the individual regional bureaus.

This pattern is followed by other donors as well.

With targeted USAID assistance, Burundi should stand to gain significantly through expanded cooperation with several IARCs on research on selected food crops and related resource management -- e.g., soil fertility, agroforestry. The three major IARC/network efforts in place in Burundi are good examples of how they work. The USAID-assisted research programs should be chosen on the basis of which ones hold out the promise of:

- ◆ Achieving significantly greater productivity in the medium or long-term;
- ◆ Either now or in the future constituting an important component in the rural Burundi diet;
- ◆ Contributing to good nutrition;
- ◆ Being environmentally sound;
- ◆ Attracting farmer interest and cooperation; and
- ◆ Eliciting a concrete commitment of Burundi resources, financial and otherwise.

The cost of an expanded IARC/network effort in Burundi should be fairly modest to USAID and Burundi. IARC operations are not cost-intensive. Expatriate scientist salaries and benefits are typically, though not always, paid for out of core budgets to which a large number of donors have contributed. Their modes and styles of operation in cooperating countries are modest. They are a good buy for the money.

## **E. Resource Management**

Burundi's agricultural resources are very limited. The documentation on these resources is so detailed that the detail diminishes its utility. Therefore, care must be taken to maintain a sense of proportion. The magnitude and scale for improvement in resource management in Burundi are very small. In order to define activities which have significant levels of commercial potential, it is necessary to focus on equilibria and trends which are broad enough and responsive enough to be of immediate, direct financial importance.

### **1. Land Availability/Reclamation**

It is generally more profitable for a subsistence farmer to extend, rather than to intensify, land use. The fact that subsistence farmers in Burundi have executed a series of crop changes and intensification activities, while leaving some land vacant, indicates that they have not considered vacant land to be arable. Highland marshes are difficult to weed and till. Until recently, the plains were considered too risky for crops and unhealthy for humans. The soils of Bututsi are so poor that even the forage is of very low quality. Most of the empty land in Burundi is vacant because it is difficult or impossible for traditional farmers to grow crops on it.

Removing a major constraint to bringing land under cultivation is referred to as reclamation. Irrigation and drainage are the most common means of reclamation. In the Burundian context, the use of lime can also be reclamation. Reclamation of highland swamps is progressing rapidly by means of traditional methods. On the Moso and Imbo plains, reclamation is being accomplished by irrigation.

Lime is being used to soils which would not otherwise be arable in the Bututsi. Agricultural lime is usually considered to be a soil amendment. In this role, it would differ from fertilizer in that it improves the chemistry of soil but is not important as a plant nutrient. A soil amendment is longer lasting in its effects than fertilizer and is used in much larger quantities than fertilizer. Agricultural lime is generally used as a soil amendment on soils which tend to be acid. It is not generally used for reclamation.

The current use of lime for reclamation is very limited in Burundi. But the fact that Burundi has extensive limestone deposits, some of which are in the immediate vicinity of the acidic/aluminum toxic soils of Bututsi, should be carefully considered in terms of its agricultural potential. Erratic field test results, which could be caused by any number of random production factors, do not negate the fundamental fact that lime can be used to remedy the acidity/aluminum toxicity problems of Burundi's soils.

Acidity/aluminum toxicity is a chronic problem for most of Burundi's highland soils. In Bututsi, this problem is often so acute that crop production is impossible on land which would otherwise be easily tillable. On acid/aluminum toxic soils, the addition of lime has the effect of increasing the number of nutrient ions available to a plant and decreasing the number of toxic aluminum ions available to a plant. Given the extremely weathered condition of most of Burundi's soils, lime can be important as a source of calcium and magnesium to a crop.

Because of the quantities used, a soil amendment must be cheap in order to be economic. In Burundi, lime is often used more as a fertilizer -- i.e., small quantities placed in the immediate proximity to a crop plant -- rather than as a soil amendment -- i.e., large quantities spread across an entire field. Even in this use, it serves the purpose of opening otherwise non-arable land to crop production.

Ground limestone would be cheaper than the burnt lime which is currently produced in Burundi, but burnt limestone can be produced artisanally. Grinding limestone requires equipment. Ground limestone is less active than burnt limestone but it has a longer residual effect. Most lime used for agricultural purposes is in ground, rather than burnt, form.

Lime use in Burundi is very limited both in extent and technology. Only a few hundred tons per year are produced and used. One producer estimates that, given five years to build the market, he could sell about 5,000 tons of lime. The attempt to expand Burundi's production of agricultural lime should proceed judiciously. There are numerous limestone deposits in Burundi. Lime production could be increased by establishing new sites, as well as by expanding production on existing sites. The GOB currently levies a 30 percent tax on domestic production of lime.

## 2. Soil Degradation/Agricultural Inputs

The level of complementarity is high between the intensification of farming and good land resource management. The production of vigorous, well-tended crops is a result of good soil management. Intensification also contributes to soil protection and soil improvement.

Most of the soil degradation which has taken place in the Burundian highlands occurred quickly as the practice of fallowing went out of the farming systems. Farmers have found it more profitable to continually farm degraded soils, than to practice bush and grass fallows required to give the soil high yield potential for occasional cropping. Thus, they have caused soil degradation in the process of increasing land productivity.

Further, during much of this century, highland farmers in Burundi have compensated for the effects of soil degradation and population pressure by growing the less demanding root and tuber crops. These crops are capable of producing large quantities of carbohydrates on degraded soils. Given the Burundian farmers limited access to inputs, changing crops has been the most effective means which a highland farmer has had for dealing with increasing demands on soils with declining fertility.

The marginal, on-going process of soil degradation is best described as chronic, rather than acute. With few exceptions, soil degradation is the natural result of farming in general and of continual cropping in particular. This is as true in Arkansas and California as it is in Burundi. The results of soil degradation can be compensated for by a wide range of cultural practices. These include tillage and crop residue management, as well as applying fertilizer and soil amendments, such as lime and gypsum, to the soil.

Compensating for the effects of soil degradation is usually the focus of major expenditures on most farms throughout the world. The absence of significant commercial activity centered on this phase of farming in the Burundian highlands would indicate that it represents a promising, unexploited opportunity for business activity. In fact, there is clear evidence of strong demand for fertilizer at unsubsidized prices in the highlands. However, fertilizer application on most highland soils is not always uniform or predictable in its results.

Highland soils are very weathered and have good structure. The resulting combination of inactive clay and good physical characteristics give these soils some of the same management characteristics as very sandy soils. They are easy to work, have good internal drainage, and are not highly erosive. Related to these advantages are two major problems. Highland soils do not retain moisture and they do not retain nutrients. The problem of non-response to fertilizer applications can be remedied by applying organic matter to the soil with the fertilizer. The necessity and effectiveness of this practice have been demonstrated.

The increased dry season farming activity on highland marshes should be another opportunity for profitable fertilizer use. The soils of the marshes are heavy and difficult to work, but they should be responsive to fertilizer application.

If lime is added to the combination of fertilizer and organic matter applied to the soils, the crop response is increased -- assuming that the seed being used is of a suitable quality and variety and that suitable plant protection is practiced.

When problems of soil degradation are addressed, the fundamental equilibria of crop production in the highlands are influenced. Burundi's major export crop -- coffee -- competes directly with a wide range of food crops. Using inputs to increase food crop yields will reduce pressure to change crops on land currently used for coffee production.

### **3. Soil Erosion/Subsidies**

Soil erosion in the form of soil slumping and landslides is acute on the western slope as a result of the removal of the forest and the cutting of roads. Unfortunately, since this has occurred, there is very little which can be done now to remedy the situation even in the long-term.

Soil erosion in the highlands, like soil degradation, is best described as chronic, rather than acute. The steep slopes and high rainfall give the impression that the land would be very vulnerable to soil erosion but the soils are not highly erosive. The high rainfall causes vigorous plant growth which helps hold the soil in place. It is clear that subsistence farmers understand the dangers of soil erosion and commonly take measures to control it.

Soil is most vulnerable to erosion when fields with long furrows parallel to a steep slope are bare when heavy rainfall occurs. Soils are at highest risk at the end of the dry season when fields have been planted but the crop has not yet emerged. Another dangerous situation for soils occurs when a farmer is in the process of abandoning a marginal field. Under such circumstances, the farmer generally makes no attempt to protect the soil.

More intensive agriculture protects the soil from erosion by keeping the soil covered. Intercropping helps in this respect. Fertilizer is important because it encourages vigorous crop growth. Perennial and long-term crops also contribute to keeping the soil covered. Forages are considered to be the best crops for protecting and building soils. These are production activities which help protect the soil.

Soils are put at risk when there is no short-term financial gain to be realized from practices which protect the soil. Saving marginal, fragile soils is important. They can be put to good use for pasture or forest. But the situation is highly problematic because returns are realized only in the long-term. For this reason, soil conservation is identified with subsidies, rather than with commercial activity.

The importance of linking soil protection with economic activity is well-understood in Burundi. A colonial project mandating contour ditches and grass bands was neither technically nor economically sound. On the other hand, it has been shown that bananas, even in a single row, are highly effective in protecting the soil. Consequently, the GOB has a program in place to encourage farmers to plant bananas across their fields. This is an idea which is well worth a

promotional effort. It links financial benefit and soil protection. But it does not offer any opportunity for commercial activity.

#### **4. Water Resources/Regulation**

What is good for increasing the agricultural productivity of land resources can often be devastating for water resources. There is a fundamental conflict between increased use of agricultural inputs and protecting water quality. On the one hand, privatization of Burundi's agricultural input distribution should be positive in terms of protecting Burundi's water resources because elimination of government and donor subsidies for pesticides and fertilizers will encourage more economical use of these inputs. On the other, however, given Burundi's topography, if privatization leads to widespread adoption of high input agriculture this could have a negative impact on Burundi's water resources. Development of the Imbo Plain for irrigated, high input agriculture could, affect the water quality of Lake Tangyanika.

This is not an immediate threat but prevention of water pollution problems is important. Adverse consequences can result quickly once a critical concentration of toxic materials is reached. Applying remedies is difficult and expensive when improper chemical use practices have become established. Privatization of chemical input distribution, therefore, should be looked upon as an opportunity to establish the proper relationship between commercial activity and government regulation with regard to protection of water resources.

Attention should be given to chemicals meant for field use on non-food crops - or on food crops with a required interval before harvest -- are being used for storage protection of food crops. For a small investment of money and time in appropriate public regulations and education, USAID would be sure to be on the right side of the proper-use-of-chemicals issue.

## VII. **RECOMMENDED USAID STRATEGY IN THE AGRICULTURAL ECONOMY AND OBJECTIVELY VERIFIABLE IMPACT INDICATORS**

### A. **USAID Strategy in the Agricultural Economy**

Key elements of the proposed USAID strategy vis-a-vis development of private sector participation in the agricultural economy of Burundi are:

#### 1. **Commodity Import Program [CIP]**

##### a. **Commodities for Importation**

The exact composition of products to be imported over 5 to 7 years under a USAID CIP would have to be determined at a later date by a Program Assistance Approval Document [PAAD] design team. The range of products to be imported would not necessarily be limited to agricultural inputs, broadly defined. But, within the group of products destined for the agricultural economy, we would envisage, at least, significant quantities of:

- ◆ Chemical fertilizers and phytosanitary products;
- ◆ Certain types of seeds either unavailable or not feasible to produce in Burundi -- e.g., hybrid maize and sorghum varieties, vegetable seed;
- ◆ Agricultural equipment needed for development of a local lime industry -- e.g., small-scale grinding and bagging equipment; and
- ◆ Machinery for modernization of existing agro-industrial enterprises after privatization and to support new innovations in product packaging and related activities.

##### b. **Foreign Exchange Effect**

The total foreign exchange benefit to be derived from a CIP will be proportional to the total investment USAID deems necessary to cover import needs in the targeted areas and to induce a minimum set of desired policy changes.

##### c. **Conditionality Attached to the CIP**

The conditionality elements to be attached to any CIP would obviously have to be formulated and negotiated at a later date. At present, we would suggest that the following four elements would constitute a minimum set of conditionality objectives:

- ◆ **GOB agreement to progressive privatization of the entire agricultural input delivery system, chiefly through a prohibition on direct project/SRD involvement in the procurement and distribution of inputs for both export and food crops.**
- ◆ **GOB commitment to progressive removal of all commercial, legal and foreign trade obstacles to fair and open competition in procurement, distribution and marketing of agricultural inputs.**
- ◆ **Evidence that the GOB had secured necessary donor commitments to a restructuring of the system by which agricultural inputs are made available to domestic consumers, chiefly through collective donor withdrawal from direct input supply to projects and promotion of an open system of auctions of inputs to private entrepreneurs under a full cost pricing regime.**
- ◆ **GOB commitment to assumption of its legitimate role as the guarantor of the product quality for domestic consumers and protector of the society with respect to health and other risks in input use.**

#### **d. Uses of Local Currency**

AID considers local currency generated under a CIP to be host country owned. Generally, proceeds are deposited into a special account jointly programmed by the host country and AID for purposes stated in the PAAD.

To further the objectives of the recommended USAID/Burundi agricultural economy strategy, local currency generated under the suggested CIP could be most effectively used to:

Finance local currency requirements under the BEST project, such as:

- ◆ **Feasibility studies in the agro-industrial sector;**
- ◆ **International travel to study experiences of other countries (if it can be purchased with local currency); and**
- ◆ **Local workshops and conferences and travel.**

Support in-country activities of IARCs and regional networks, including:

- ◆ **Program operating costs -- training, travel, etc. -- over and above agreed levels of GOB financial contribution.**

Provide small strengthening grants to stimulate expansion of a private sector agricultural input distribution system and associated technical services in the medium-term.

Finance the local costs of the Mission's socio-economic monitoring and impact evaluation system for all USAID-sponsored development activities.

While AID policy permits local currency generations to be used for public sector support -- e.g., to agriculture through the Ministry of Agriculture -- this type of programming would not be desirable considering the small contribution the GOB now makes to the Ministry's budget.

## **2. Encouragement of a Permanent, Private and Gender-Neutral System for Distribution of Agricultural Inputs in Burundi**

Supplying agricultural inputs should be a major private commercial activity in Burundi. Private participation is possible over a broad range of business size from the national to *colline* levels. By providing farmers with improved access to agricultural inputs at competitive prices and in appropriate packaging and lot sizes, a private system would assure that individuals with a minimum of capital and entrepreneurial experience could become involved in marketing agricultural inputs.

## **3. Assistance to the Privatization of Public Agro-Industrial Enterprises through the BEPP/BEST Mechanism**

Assistance in this category can be broken down into two categories. First, the GOB has already requested assistance from USAID in analyzing and organizing government divestiture of selected public enterprises. USAID is in the process of responding to this request.

Second, individual entrepreneurs or larger businesses with sufficient capital to assume control of an existing public enterprise will often require guidance on how the new business can be operated profitably in a competitive environment. The existing BEPP/BEST is an ideal mechanism to provide necessary commercial information, personnel training, enterprise consulting, and observational travel for Burundian business leaders.

## **4. Targeted Support for Analysis of Potential Non-Traditional Export Crops through the BEPP/BEST Mechanism**

There is an obvious need for targeted assistance to individual entrepreneurs and business associations in determining the financial feasibility of enterprises with traditional products -- i.e., tanning of hides and skins -- and/or non-traditional export crops -- i.e., fresh fruits and vegetables, flowers and foliage plants, etc.. The objective of such assistance should not be to conduct feasibility studies to justify entrepreneurial activity with these products but to seriously evaluate the financial prospects for a successful business venture. In this regard, USAID must be careful in writing Terms of Reference for such studies to indicate to the implementors that negative feasibility findings are as acceptable as positive ones and that total objectivity with respect to actual commercial prospects is desired.

## **5. Support for Agricultural Research in Burundi through the IARCs and the Regional Networks**

To achieve greater factor productivities and strengthen the prospects for sustainable agricultural enterprises in Burundi, agricultural research must generate and/or import and test a continuous stream of agricultural innovations. USAID should target its assistance to research on selected crops and resource management problems through the IARCs and to selected regional networks where Burundi is a participating member. Such support should be conditional on the GOB's making substantial inputs -- financial and otherwise -- to the on-going programs.

## **6. Training of Agricultural Specialists through the IARCs, the United States Land Grant Universities, and Other Educational Facilities**

Trained people are an essential resource necessary for improving agricultural efficiency and effectiveness. USAID to its credit has always recognized and acted on this basic premise. In this instance, USAID should finance as appropriate agricultural technician-level training at the IARCS; degree training for agricultural and social scientists at American land grant universities; and a variety of shorter-term educational opportunities.

### **B. Objectively Verifiable Impact Indicators**

In attempting to contribute to USAID's on-going discussion about feasible impact measurement indicators for the proposed strategy for the agricultural economy, the team reviewed the range of statements the Mission had already put forth in its decision tree exercise in February 1992. While we do not see the proposed strategy relating to all of the statements in the tree -- or even all of those put forth for agricultural activities -- we have attempted to respond below to a sub-set of the most important and non-duplicative statements. In doing so, we have approached the problem in terms of indicators which would effectively monitor strategy impacts and in turn be feasible to monitor given existing USAID and GOB resources in Burundi.

#### **1. Goal Level**

##### **a. Increase Burundian Economic Productivity and Production**

**Indicator 1 --** Number and value of person-days of employment created in the agricultural economy through privatization of the agricultural input distribution system.

**Indicator 2 --** Total cost savings accruing to government from privatization of public agro-industrial enterprises and removal of subsidies on agricultural inputs.

**Indicator 3 --** Changes in production of food crops per person-day of rural household labor and per hectare in cultivation as compared with baseline rural households.

**Indicator 4 --** Changes in net cash returns from marketed sales of food and export crops per participating rural household as compared with baseline rural households.

**b. Increase Equity of Income Distribution**

**Indicator 1 --** Decreased variability in net farm incomes among cohort rural households using improved agricultural technologies as compared with a baseline sample of rural households.

**Indicator 2 --** Changes in the percent of agricultural inputs purchased by women and/or marketed through women's groups as compared to the base year.

**2. Purpose Level**

**a. Increase Earnings from Goods Produced by Rural Households**

**Indicator 1 --** Changes in net farm income from crops per cohort rural households using agricultural inputs as compared with baseline households.

**3. Objective Level**

**a. Increase Agricultural Crop Production and Productivity**

**Indicator 1 --** Changes in yields of physical product per hectare cultivated to food and export crops per cohort rural households using agricultural inputs as compared with baseline households.

**Indicator 2 --** Changes in yields of physical product per person-day of household labor engaged cultivation of food and export crops per cohort rural households using agricultural inputs as compared with baseline households.

**Indicator 3 --** Changes in yields of physical product per unit of capital expenditure spent on agricultural inputs -- i.e., fertilizer, improved seed, etc..

**b. Increase Marketing of Burundian Products**

**Indicator 1 --** Changes in the percentage of total food crop production marketed per cohort rural households using agricultural inputs as compared with baseline households.

- Indicator 2** -- Changes in the values and tonnages of improved seeds sold to rural households as compared with the base year.
- Indicator 3** -- Changes in the values and tonnages of domestic agricultural lime sold to rural households as compared with the base year.
- Indicator 4** -- Changes in the values and tonnages of coffee sold in high price niche markets in the United States and Europe.
- Indicator 5** -- Changes in the values and tonnages of non-traditional export crops sold in high price niche markets in the United States and Europe.

#### **4. Sub-Objective Level**

##### **a. Expand Burundian Entrepreneurial Class**

- Indicator 1** -- Changes in the number of Burundians distributing agricultural inputs through private sector channels.
- Indicator 2** -- Changes in the number of Burundians engaged in post-farm gate, private sector processing and marketing of traditional and non-traditional export crops.

##### **b. Increase Domestic Capital Investment**

- Indicator 1** -- Changes in the value of private sector shares and other equity holdings in agro-industrial firms in Burundi.

##### **c. Increase Foreign Participation in the Economy**

- Indicator 1** -- Changes in the number of private foreign firms engaged in supply and distribution of agricultural inputs in Burundi.
- Indicator 2** -- Changes in the number of agro-industrial joint ventures established with external participation.

##### **d. Expand In-Country Processing Capacity**

- Indicator 1** -- Changes in the number of private limestone processing firms operating and the aggregate tonnage of agricultural lime produced.

**e. Increase Marketing Efficiency**

- Indicator 1** -- Changes in the marketing margins charged by private sector supplies of agricultural goods and services as compared with implicit margins charged by public enterprises, SRDs and projects.
- Indicator 2** -- Changes in the unit costs of agricultural inputs paid by farmers net of subsidy removal and inflation effects.
- Indicator 3** -- Changes in unit costs of agricultural inputs by a regional basis reflective of actual transport and transaction costs.

## **Report Annexes**

## **Annex 1**

### **Status and Future of the Seed Program**

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Three charges were given to the consultant regarding seed. These included:

- ◆ To evaluate progress in the development of the National Seed Plan [NSP] for Burundi and the support to the seeds component of the SFSR project.
- ◆ To estimate the near-term potential for new food crop varieties that might emerge from ISABU breeding programs and move into the national seed programs.
- ◆ To suggest areas within the seed development and distribution systems where opportunities might exist for involvement of the private sector, including individual entrepreneurs and companies.

Food crops included in this evaluation will include: potatoes, maize, beans, rice, wheat and sorghum -- since these are the major crops included in the NSP.

## **I. Evaluation of the Accomplishments of the SFSR Project [University of Arkansas and Mississippi State University] in Support of the Development of the National Seed Plan for Burundi**

### **A. Background**

Varietal research began on export crops in Burundi in 1929. Since then, plant breeding efforts have expanded to cover the major export and food crops of the nation. Nearly all breeding research is carried on under the leadership of ISABU. Most funding for plant breeding research comes from the Belgian government. In recent years collaboration has been initiated with relevant IARCs, including CIP, CIAT, CIMMYT, ICRISAT and IITA.

Seed production facilities were installed by ISABU in 1977, with assistance from the Belgian government. During the next decade, many rural development projects were established, each with its own program and facilities for seed multiplication and distribution. By 1987, Burundi had 45 different seed multiplication centers. Coordination of seed quality control was informal and often lacking, both among programs and between research centers. As a result, the quality of the seeds was erratic and supplies of basic seeds were often inadequate to farmers' needs. Some reviewers described the seed situation as "chaotic". Even so, new varieties were being developed and some improved seeds were moving to farmers.

In 1988, the NSP was developed for Burundi. The Plan called for coordination and strengthening of seed activities, including the production of pre-basic and basic seeds. Consultants from Mississippi State University [MSU] participated in the design of the NSP. In 1989, technical assistance for the development of the NSP was included as a component of the USAID SFSR project. The prime contractor for the SFSR project is the University of Arkansas.

In 1990, a project amendment broadened the SFSR seed component. The amendment provided for a resident seed specialist in the project to be based in Gitega under the Director General of Agriculture. This specialist was to advise ISABU -- and through it the GOB -- on matters related to seed improvement and assist with implementation of the NSP. The amendment also provided for up to 14 person-months of short-term consultant time to cover specialized topics related to seed quality control, seed pricing and marketing, and seed legislation. The SFSR prime contractor developed a sub-contractual agreement with MSU to provide these services.

Steven Walls was appointed as the SFSR project seed specialist. He arrived in Burundi in December 1990. SFSR short-term consultants have included: James Delouche [two visits on seed program development and on seed legislation] and Warren Couvillion [on cost evaluations of basic seed production, particularly at the Kajondi farm].

## B. **Project Evaluation**

The GOB has made considerable progress in implementing the features of the NSP. Examples include: the formation of the National Seed Council [NSC] to coordinate seed programs; and the development of the National Seed Service [SNS] to oversee seed quality programs. Training programs have developed a middle layer of seed specialists. The improvement and expansion of several seed farms, particularly that at Kajondi, have increased the capacity to produce basic seed to meet the needs of seed growers and some farmers.

These developments have improved the seed situation for food crops in Burundi. Pre-basic seeds are being increased to basic seeds [though success is greater in some crops than others]. Basic seeds are being multiplied in volumes sufficient to meet the limited capabilities of the seed distribution systems. Seed quality of basic and pre-basic seeds is being checked and increasing volumes of improved seeds are being grown and supplied to farmers.

The MSU personnel provided under the SFSR project have facilitated these developments. Policy papers and consultations have helped GOB decision-makers to develop appropriate structures for seed improvement. Training has increased the capacities of seed program administrators and technicians. And, finally, USAID funding at key junctures has helped in the development of important program elements.

Despite these advances, the GOB and its seed institutions have much to do to expand the availability of high quality seeds to farmers and to achieve the goals of the NSP. Major challenges include:

- ◆ A serious need for more consistent supplies and faster build-up of stocks of new varieties of some crops within the ISABU pre-basic seed production program.
- ◆ Improved linkage between the basic seeds produced by the SNS and seed sown by local farmers. This may include involving the current retailers of seed in market shops, rural cooperatives, and other places where many farmers now buy seeds.

- ◆ The lack of awareness by most farmers of the advantages of high quality seeds. Farmers will not pay the higher prices needed for improved seeds unless they are convinced they will profit -- or grow more food -- by doing so. Information provided to this consultant from several sources indicated that most farmers do not purchase or plant improved seeds. They are not convinced that these seeds are better than those from their present sources.
- ◆ Major adjustments to the system will be necessary when, as per GOB planning, responsibilities for distribution of seeds and other inputs to farmers are taken from government projects and commune-level extension *agronomes*. On the plus side, such a policy change will free up extension time to do more teaching. But whether private entrepreneurs are ready or able to pick up seed distribution at this time and for all food crops seems questionable.

Overall, the structural components are coming into place for a high quality seed program in Burundi. This can become a nation-wide and effective NSP, with strong private sector participation. However not all components are working effectively at this time and not all crops are equally adapted to immediate privatization.

Above all, a series of informational needs must be met to develop a high impact, quality seed program in Burundi. This must include expanded information for seed planners, growers, marketers, extension workers and, most importantly, farmers. Several key informational needs are:

- ◆ Improved production planning information to help determine how much basic seed to grow for specific varieties and kinds, and to serve as a basis for setting seed prices. This should include information on production costs, as related to the current seed farms and contract growers. It must also include careful estimates of farmer demand, to avoid costly over-production.
- ◆ Expanded information on seed marketing systems. How, where, and by what route do farmers get their seed? The current marketing studies being conducted by SFSR researchers [Wall and Smith] should develop useful information of this type for bean and potato seeds.
- ◆ Improved information on the factors that affect farmers decisions to buy -- or not buy -- high quality seed of improved varieties? Here too, the Wall and Smith surveys should help.
- ◆ Development of improved plans for producing and marketing improved seed so that it is available to all farmers.
- ◆ Expanded extension teaching of farmers to acquaint them with the advantages of high quality seed, certified or otherwise. This last may be the most critical need of the group. Unless the final customers -- farmers -- are convinced of the value of high quality seed, no seed program can be successful.

### **c. Evaluation of Individual Components**

A National Seed Council [NSC] was called for in the NSP to oversee and guide implementation of the Plan in Burundi. The NSC has been formed and is operating. It appears to be off to an effective start in setting seed policy and seems to be dealing with many of the real issues affecting seeds in Burundi. The membership of the NSC includes presently the Directors General of Agriculture and ISABU and other high level GOB officials concerned with the seed program.

This consultant, however, noted at least one problem with NSC membership that may eventually limit its effectiveness. It appears that the present membership does not include any farmer seed growers or commercial interests, although such member representation was called for in the NSP. Experience in other countries -- and my personal experience -- has shown that well chosen representatives from these private sector groups can provide valuable inputs in keying seed programs to meet user needs. I would suggest that an advisory committee from these groups be formed, to develop recommendations on variety release, seed needs, and seed pricing. This could involve these key groups and gain their input, leaving the Council to develop policy issues.

The SNS was designed to develop and operate a seed quality control and seed certification service for Burundi. Services now include field inspection of seed crops. Seed inspections will be added soon, as soon as a laboratory for quality evaluation and control is added at Gitega.

The SNS is operating and carrying out field inspections of basic and post-basic seed fields -- including those on seed farms and contract grower farms. The SNS has an administrative head and a supervisor of seed quality and certification, who trains and supervises field inspectors. Steven Walls has served as technical advisor to the SNS on administration and policy and on the development of quality control and certification procedures.

The SNS, in consultation with Walls, has developed several documents for field inspection services. These include a Seed Inspectors Handbook and field inspection forms. SNS field inspectors have received training in using these documents and are doing so in their field inspections. I have examined these documents and find them well designed. They are in agreement with field inspection procedures used in the United States and other countries with quality seed programs.

The SNS has surveyed the regional projects to determine how they develop their seed orders and other information relating to seed ordering and pricing. Seed ordering turns out to be difficult for those who really try to anticipate needs but easy for most, who just guess. The SNS found a real need to refine its planning of seed production goals, faced with the haphazard estimates from the projects.

The lack of a seed quality and testing laboratory is a current problem for the SNS. This need must be addressed before the SNS can fully "certify" seed. Funding has been promised from the Belgian government for a building and from USAID for equipment. Walls has ordered equipment and hopes the SNS can begin laboratory construction within the next two months. In the meantime, he has located a facility for a temporary laboratory and hopes that this will be

operating within the next two weeks.

The precise role of the SNS has been debated, particularly whether its responsibilities should include only seed quality and seed certification, or whether it should also continue to develop seed production. The SNS is currently producing basic seeds on farms and through contract growers. It provides contract growers with fertilizer, pesticides and seed inputs and deducts the costs of these inputs from farmer payments for the seed they sell back to the SNS. However, the SNS is having some problems with this system because the value of seed sold back to the SNS by contract growers does not always equal the costs of the inputs supplied. Worse yet, in nearly one-fourth of the cases this consultant reviewed, no seed was returned by growers.

This consultant regards the active participation of the SNS in seed production as a potential problem. The SNS is designed and is operating well as a seed quality control and certification agency. But control and production make poor bedfellows. Involvement in seed production will distract its personnel from its major mission. A seed production enterprise within SNS is apt to produce conflicts of interest. These can occur when SNS is placed in the position of certifying its own fields and seed. There will be the temptation to approve marginal fields in which the SNS has a financial interest. For these reasons, most nations of the world delegate to separate responsibilities for seed quality certification and for seed production to separate agencies. These agencies may be closely associated but they should have minimal -- or preferably no -- financial links one to the other.

Financial involvement in seed production makes the SNS vulnerable to large financial losses. Losses can occur quickly if the SNS misjudges effective seed demand, produces more than the market can clear, and then has seed lost through spoilage. The SNS has already incurred financial losses because some farmers and projects have failed to pay for or deliver sufficient seed to cover the cost of inputs provided on credit.

A seed pricing policy that was both equitable and recognized the added costs of producing ..gh quality seeds was called for in the NSP. To these ends, Dr. Warren Couvillion, a seed marketing economist from MSU, completed an analysis of the costs and returns for producing seed on the Kajondi farm and on the farms of contract growers in March 1992. His figures provide the best figures available on the costs of producing seeds on these farms and should be considered in setting seed prices from these farms.

A draft seed law for Burundi was developed, in consultation with Dr. James Delouche of MSU. This consultant has reviewed the draft for that law, and found it uniquely appropriate for the situation in Burundi. It is designed to encourage, rather than restrict, the development of seed production initiatives by both public and private seed enterprises. It is also designed to be implemented gradually as its components may become useful in Burundi. This draft seed law can provide helpful guidance during the evolution of the seed industry in Burundi.

The development of a National Seed Society [NSS] was called for in the NSP. Its purposes, though vague, were apparently to include the production, marketing and distribution of basic and certified seeds. The formation of such a Society continues to be controversial. Concerns have been expressed by Delouche and in the 1991 evaluation of the SFSR Project. They fear that this

NSS could easily develop into yet another parastatal that would block, rather than encourage, private development of seed programs. The National Seed Society has been dormant, but interest seems to be reviving. This consultant agrees with Delouche and the 1991 reviewers. If the NSS is not needed it should not be formed. If formed, it should be kept "lean and efficient", in the words of the 1991 reviewers. Burundi does not need another parastatal to subsidize, particularly one that could impede development of the private sector in seed production and marketing.

Three levels of training were recommended in the NSP including:

- ◆ In-depth professional training [M.S. degree level] for agronomists in seed science for two Burundian seed scientists. To date, one agronomist has obtained his MS degree from MSU, namely Pegase Banyankeye, now manager of the Kajondi Farm. Another, the head of the ISABU seed laboratory is preparing to take leave this June to begin M.S. studies at MSU. This will complete this commitment.
- ◆ Professional training in seed technology. To date, four Burundians have participated in the MSU Seed Improvement Training Course. Another Burundian attended the ASFIS Seed Quality Course in France. Five others have participated in foreign study tours and seminars. All of the above individuals now hold leadership positions in Burundi seed and agriculture programs.
- ◆ In-country intermediate level training [2-3 weeks] for program workers. A two week short course has been held covering seed inspection and laboratory techniques for five SNS inspectors and two laboratory technicians. A one week short course was held to provide computer training in Wordperfect and Lotus. Participating were eight secretaries from SNS and the Department of Agriculture and five SNS staff.
- ◆ Seed grower training was initiated in a session for seed potato growers in the Bututsi area. Such training should be continued and expanded for all seed growers and should be built into the program of SNS personnel. Seed grower training sessions are essential and should be held annually.

Participation of ISABU breeders and seed production personnel could turn seed grower training sessions into valuable two-way communication opportunities. Breeders could inform growers of varieties nearing release and their traits in order to encourage growers to produce and market these varieties. Also, seed growers could inform breeders of the performance of current varieties, and of diseases or other problems occurring in their fields. This can help breeders in designing their breeding efforts to meet grower needs.

- ◆ Few extension workers at the commune and colline levels appear to understand and enthusiastically promote the benefits of high quality seed. These individuals play key roles in the education of farmers about good seeds, and also in the ordering and delivery of seeds and other inputs for farmers. While this procurement responsibility may change, extension agents will still be the prime educators for local farmers. They must be convinced of the value of high quality seed, and help to promote a high seed quality mentality in Burundi.

The NSP called for continuation and expansion of several existing programs:

- ◆ Continued participation by ISABU scientists in the development of new and improved crop varieties. This participation continues and will be evaluated on a crop-by-crop basis in the section below.
- ◆ Improvement of ISABU's ability to produce pre-basic [breeder] seed and provide this for further increase to basic seed. This problem seems to vary between crops. It will be discussed by crop in the next section.
- ◆ The expansion and development of the Kajondi seed farm for the production of basic [foundation] seed. The Kajondi seed farm has major problems but some strengths.

One serious problem is its location on highly acidic soils [pH levels at 4.3 to 4.8], low in natural fertility and organic matter, with toxic levels of aluminum in the soil solution. The organic matter is so critical to production that the farm maintains a herd of about 100 cattle to contribute manure. This is composted with grass, then added to soils ahead of crops. We were told that uncomposted crops yield only half as much as those receiving compost, even with fertilizer.

Another problem is the large number of people working on the farm. This includes some 37 workers (including about 11 for the cattle). Wage rates are low but housing is provided, along with some other benefits. Since the farm has adequate mechanization for its tasks, it would seem that fewer workers should be needed. A seed farm of similar size could be operated by three to five persons, assuming they receive training and acquire appropriate skills.

The farm is well equipped with machinery, including two tractors, a grain combine, corn and wheat planters, and tillage and cultivating equipment. Most implements seemed in working order, despite being nine to ten years old. This suggests that one or more members of the farm crew have some mechanical skills.

The farm has good seed conditioning equipment for grain seeds. The cleaner and other facilities are not fancy, but are well chosen for this farm. We were told these facilities operate about 30 days per year. The corn dryer is a problem, and has never operated since its installation ten years ago. The problem seems to be in the dryer fan, which may be installed wrong. This should be fixed, since some heat is needed to dry corn in the humid conditions that prevail for most of the year.

The farm has potato and grain storage sheds. These are built with local materials, and seem well adapted to their use.

The cost of producing seed on the Kajondi farm was analyzed by consultant Warren Couvillion [March, 1992]. His findings are included in his report. They suggest that production costs are high on this farm [high labor costs and large storage losses]. His figures also raise questions about whether the farm is paid in full for seed produced and

delivered. The farm may also be over-producing basic seeds of some crops. Unsold inventory of potatoes could be disastrous, as they would spoil, and soon be unsaleable. Couvillion's figures suggest that the farm can continue to operate as is only if continues to receive donor subsidies.

The handling of potatoes culled because of bacterial wilt infection may be a serious problem on this and other seed potato farms in the highlands. The present procedure is for culls to be sold for food. The general belief on each farm was that some of these diseased potatoes end up being planted as seed. This is a triple problem, since farmers will get lower yields due to disease than they might from other seed; such seed will infect their fields with this soil-borne disease; and some would surely tell their neighbors about the diseased seed obtained from the farm, damaging the reputation of the seed farms, and of "certified" seed.

## II. **Evaluation of ISABU Plant Breeding Research Programs**

A successful seed improvement program must be based on a regular flow of improved crop varieties. Farmers will not pay the added cost for "improved" seeds unless they believe that the seed obtained is better than that they can produce themselves, or can obtain at low prices in local markets. In Burundi, ISABU breeding projects exist for all of the major food crops, and most of the minor crops.

This consultant was asked to evaluate the potential of these programs, and particularly to examine their ability to contribute superior varieties that could provide near-term support for seed improvement programs. To this end, I met with ISABU breeders for the crops included in the NSP, namely potatoes, rice, beans, maize, wheat, and sorghum. I also examined documents, yield data, and other information on present and potential varieties, and discussed the acceptance of these varieties with seed specialists.

Production of pre-basic seeds of new varieties to increase basic seed stocks is essential in the seed increase program. Though this is not carried out as part of the breeding programs, I discussed this with the breeders, as well as with seed program specialists. Since this is a bottleneck in some crops, I will comment on each situation, as it was described to me.

One major strength in each of these breeding projects is the participation of the scientists in programs of the relevant IARCs. These include CIP for potatoes, CIAT for beans, CIMMYT for maize and wheat, IRRI and IITA for rice, and ICRISAT for sorghum. These IARCs provide varieties, breeding lines, and populations for screening under Burundi conditions, and cooperate with disease testing, technician training, and provide entry to the international breeding network on these crops.

### A. **Potatoes**

The Burundi national potato program is one of the most productive and best focused of the programs I reviewed. The goals of the ISABU potato breeding program are to develop superior

varieties with improved resistance to bacterial wilt and late blight, the two serious potato diseases of the country. Present varieties lack resistance to these diseases. New varieties should also have excellent eating quality, and be well accepted in commercial markets.

The program appears to be productive, with several new varieties about to emerge. Breeders have released 12 varieties since 1979 when the program began. Four of these are now in use, with two -- i.e., Ndinamagara and Uganda 11 -- now the dominant varieties of the country. Four new clones will be ready for release next year. CIP germplasm has been helpful, providing clones adapted to both high and low altitudes.

Procedures for developing disease free seed are an equally important contribution from CIP to the Burundi program. Since 1987, a greenhouse system for propagation of pathogen tested plantlets has been used to develop disease free seed of improved varieties. This involves initial propagation from single node cuttings, to develop microtubers in sterile soil. These are used, in turn, to produce disease-free stock seed tubers. This system has reduced the incidence of bacterial wilt to below 3 percent in the Bututsi CVHA and Kajondi areas where basic stock seeds are produced.

Pre-basic seeds are produced at Gisozi by the ISABU pre-basic seed unit. Basic seeds are produced on seed farms at Kajondi, Makura and Mwokora. This year, the Kajondi farm has enlisted 80 farmers as contract growers, each with about 0.5 hectares. The concept is for Kajondi to take back about 75 percent of each farmers crop, to supplement its own production for distribution. The farmer will retain 25 percent of his crop to market himself, locally or as he may see fit.

A current problem is that Ndinamagara is the only variety now being multiplied due to latent bacterial wilt infection in other varieties. Ndinamagara is well accepted in the highlands, but not in urban markets due to spots of purple coloring that appear in internal meristematic tissue. Uganda 11 is preferred by urban buyers, and so brings good prices. Some farmers would prefer to grow Uganda 11 because of this higher price. There is an apparent need for a new variety with high yield potential and with uniform internal coloring.

## B. **Rice**

The rice breeding program seems highly productive, with some 21 varieties released, recommended, and in the seed multiplication program. This includes two to three varieties for each of the rice-growing environments of the country. The ISABU rice breeding program receives support from Belgian Technical Cooperation, North Korea, and the EC. Collaboration exists with IITA and IRRI. The program includes materials from Africa, China and North Korea. The breeding goals for the upland marshes are for varieties with tolerance to cold and for resistance to the "blast" disease.

Certainly the ISABU rice breeder has developed a impressive program that can turn out superior varieties. The program may be too prolific for the seed system. With 21 varieties, this must provide a huge challenge for pre-basic and basic seed production. Many of these must require

only small quantities of seed since rice totals less than 15,000 hectares in the whole country. I was told by the breeder that the infrastructure was not adequate to handle this many varieties. I can believe it! Few seed operations in the United States could simultaneously handle 21 varieties of the same crop.

Currently "source" or "breeder" seed is produced in the breeding program. The ISABU pre-basic seed unit supposedly multiplies this seed and sends it to the SNS for basic seed production. The ISABU unit develops basic seed at a six hectare farm for lowland varieties and a 10 ha farm at RuHuHuna for midland and upland varieties. Rice seed marketing is largely controlled by the SRD in the lowlands, but some privatization is occurring. Opportunities for further privatization will be discussed in the next section.

### **c. Beans**

The ISABU bean breeding program seems capable of producing helpful varieties. However the program leadership has recently changed, and it may take several years to demonstrate its long-term productivity. In the short-term, a climbing bean selection from Rwanda shows potential as a candidate for the seed program.

The bean breeding program has released several varieties in recent years. The most widely grown varieties are A 321 and HM 21-7. The program enjoys close cooperation with CIAT, from which it obtains advanced lines and varieties for testing. CIAT has recently provided an F-2 population, as a source for selecting strains specifically adapted to Burundi. CIAT maintains technical staff, including a breeder, a pathologist, and an anthropologist, in Rwanda which serves the region and provides support for the Burundi program as part of the PRELAAC network. Breeding goals for the ISABU bean program include developing resistance to the bean shoot fly and to common and halo [bacterial] blights.

A challenge for the breeding program is that three different types of beans are grown in Burundi, including bush, semi-twining and twining (climbing) varieties. Local choice can be dictated by farmer preference, by local environment, or by soil fertility since climbing beans require higher soil fertility. For the breeding program, this means that improved varieties may be needed for each of these growth types. This compounds the breeding task.

However, the greatest challenge to the bean improvement program appears to be the difficulty of introducing a new variety to farmers. The typical farmer pattern is to grow a mixture of bean strains, rather than single varieties. An improved variety placed in a mixture with eight to twelve other strains has difficulty attracting the farmer's attention. Some farmers will plant a row or two of a new variety to evaluate it before they add it to their mixture. Farmers tend to know the traits of each strain in their mixture. However, they may eat their seed if food is short, then buy a new mixture at planting time.

I would rate the ISABU bean breeding program capable of selecting improved varieties. Pre-basic, basic and certified seeds can also be produced. The problem in beans will be to gain acceptance of any new variety into a farmer's mixture. I will discuss options for this in the

section below on seed marketing.

#### D. **Maize**

The ISABU maize project, as presently oriented, seems unlikely to contribute varieties that will be helpful to the seed program in the near-term. In fact, the program is effectively not operating this year, while it considers future directions.

The program in the past has concentrated on developing composites and open-pollinated varieties. The program has released three composites over the past decade, including: Imbo 1 for low elevations, Isega 1 for mid-elevations, and Mugamba 1 for high elevations. Test results from several locations have shown these composites consistently yielding 30 percent or more over local varieties. Several people told this consultant that these composites were no better than local farmer strains. This may be true if grown on highly acid soils, without fertilizer, lime or compost -- i.e., under conditions where no variety, farmer or otherwise, could do well. But the test results, plus my personal observations, indicate that Mugamba 1, at least, is superior to local farmer varieties, when grown with appropriate inputs.

Hybrid development has not been part of the ISABU maize breeding program. Yet test results have shown hybrids from nearby countries outyielding the best ISABU composites by 20 to 40 percent. I was told by several persons that hybrids were not practical for Burundi since farmers are accustomed to maintaining their own seed and that they cannot afford the cost of hybrid seed.

These arguments have preceded the introduction of hybrid seed in practically all countries. They have been proven wrong in country after country. Many farmers, even in Burundi, already buy maize seed frequently, if not annually. If they know that hybrid seed will outyield local varieties they will choose hybrid seeds. Seed, even hybrid seed, usually makes up less than ten percent of the total cost of growing a crop. The added yield response from hybrid seed can expand the returns from all other inputs. Farmers all over the world once saved their own seed, before hybrids were introduced. But when farmers see the advantages of hybrids, they rapidly switch and do not return to their former varieties. The potential advantages of hybrids can far surpass the annual cost of buying seed.

Yet developing a hybrid breeding program is time-consuming and expensive. I doubt if the Burundi hectareage is large enough to justify the cost and effort of a hybrid development program. Also, the production of hybrid seed takes specialized skills and care. A complicating fact is that Burundi farmers should have available at least three hybrids, one each to fit the temperature regimes at low, medium and high altitudes.

I recommend that representatives of the SNS or other appropriate persons meet with representatives of the Kenya Seed Company, Pioneer International, Cargill, or some other company operating in East or Central Africa. One or more companies should have hybrids that could do well in Burundi. The Burundi breeding program could cooperate with an interested company to test hybrids, and to help determine which varieties might do best in Burundi's three altitude zones. The company could produce the seed probably not in Burundi, at least at first. It could

and should develop its own marketing system in Burundi.

## E. Sorghum

The sorghum program has potential for success in developing varieties, including hybrids. However, the cost and effort may not be justified. The following are my observations on sorghum breeding in Burundi.

The program breeder is actively screening introduced lines for potential varieties and he has initiated a hybrid development program. He appears to be developing a productive program. He is working closely with ICRISAT, and participating in the EARSAM network. He is testing lines from these sources, and using a male sterile population from ICRISAT in his hybrid breeding program.

The ISABU sorghum program released a new variety -- *Gambella* -- in 1991. This is a white-seeded variety, designed for food uses, including bread flour. Older Burundi sorghums are brown or red-seeded and are used for making beer. The breeder released *Gambella* in the Imbo area. He included training sessions for extension agents and farmers on its culture and methods of preparing it for food. Some 50 growers are producing this variety in the Cibitoke *Atelier* this year.

Birds are a major problem in *Gambella* production. Birds do not attack the common brown and red seeded varieties of Burundi. These contain tannin in their seed coats which the birds find distasteful. But they like the white-seeded *Gambella*, with no tannin. *Gambella* may be helpful for areas on the Imbo plain where sufficient hectares can be blocked together to spread out the bird attacks, and thereby reduce the losses per hectare. But farmers in the highlands grow sorghum in small patches and are not inclined to put the effort into protecting their crop from birds, particularly since their current varieties are bird resistant.

It appears to me that white-seeded sorghums will not make a strong contribution to Burundi unless bird-resistant varieties are identified. The breeder is testing two varieties from Arkansas -- one white and the other cream-colored -- that are claimed to have bird resistance. These were recently planted, and have not yet headed.

The sorghum breeder identifies four eco-zones for sorghum in Burundi, including Imbo, Moso, Bututsi and Kirondo. Four varieties will probably be needed, if each region is to be served.

Sorghum is not a major food crop in Burundi, though it is used for beer in the highlands. Maize IS a major crop, that grows reasonably well in most of Burundi. Maize is the preferred crop in most areas of the world where it can be grown. Sorghum usually becomes important only where rainfall is not sufficient for maize. The ISABU sorghum breeder struck me as highly competent. It seems a shame to expend his ability on what is and probably will remain a minor crop.

Several seed companies have hybrid sorghum breeding programs in nearby countries. These include Kenya and Zimbabwe seed companies, as well as Pioneer. I have already suggested that

one of these companies be encouraged to distribute maize hybrids in Burundi. The same company could distribute sorghum hybrids, probably through the same network. The ISABU sorghum program could participate with the company in providing local tests to identify the hybrids best adapted to the Burundi sorghum eco-zones. This could be done by a well-trained technician. Then, ISABU could transfer the sorghum breeder to one of the more important crops, to better utilize his talents for Burundi.

## F. **Wheat**

The wheat breeding program has some potential for releasing new varieties, but these are not likely to have much impact on Burundi seed programs. Part of this is due to the small size of the total Burundi wheat crop. The national production of wheat was estimated at 9,300 tons in 1989. This could have been produced on less than 5,000 hectares. Even if new varieties are released and are successful, the volumes of seed needed will be small. Also, wheat is a crop in which farmers can and do save their own seed. Some may purchase new seed every year, but most are apt to do so less often. This further limits the size of the seed program.

The wheat breeding program recently released the variety Maringa-Alden, with resistance to stripe rust, frequently a serious disease in Burundi. Reports suggest that some 13 tons of Maringa-Alden seed were available for the 1991 season. Chova, with improved rust resistance, is released, but pre-basic seed increase appears slow and inadequate.

The wheat breeders are cooperating with CIMMYT, and are selecting from among CIMMYT lines. Maringa-Alden was a CIMMYT line. Current efforts are to screen through a series of CIMMYT lines developed for aluminum tolerance. This can be particularly important in Burundi, where nearly all wheat is grown above 1,600 meters elevation, on soils with low pH and high aluminum concentrations in the soil solution. The aluminum concentration in many highland soils is at levels toxic to wheat.

Four varieties may be released by this program within the next year. All have tolerance to aluminum toxicity, and come out of the CIMMYT program. These are being tested in farmer fields, to supplement test-plot results.

Aluminum tolerant varieties may show some increase in yields on high aluminum soils. But wheat grows best on soils with pH above 5.6 and without toxic aluminum levels. In the experience of this consultant, aluminum tolerant varieties may provide some help, but yields will still not reach levels that can be profitable to farmers, without large subsidies.

## III. **Seed Marketing Programs in Burundi**

### A. **Introduction**

This consultant was asked to examine the present multiplication and distribution systems for improved seeds of food crops in Burundi, to comment on current efforts to involve private entrepreneurs in seed activities, and to suggest steps that might expand the involvement of private

enterprise in their development.

What is the privatization potential of the individual crops discussed above? Several have substantial potential, others I believe have essentially none.

First, some thoughts on experience on privatization of seed crops in other countries. Patterns have developed in both developed and developing countries which should be considered.

Private seed companies can do well and contribute to progress in crops where hybrids are used -- i.e., maize and sorghum; where farmers replace their seed every year -- i.e., rice in Imbo; or where disease problems prevent farmers from saving their own seed -- i.e., potatoes.

Private seed companies have been less successful in crops where farmers can easily save their own seed, replacing it only as new varieties are introduced. This includes crops like wheat and beans. However, seed grower associations are often successful in these crops, agreeing to high seed quality standards, that can appeal to those farmers who do replace their seeds, or who are buying new varieties. These are often the major crops included in "certified" seed programs. To attract farmers to buy, association members must adhere to high standards for varietal purity and seed quality. The seed certification component of the SNS can assist in testing and officially labeling seeds that meet "certified seed" standards.

## B. Maize

As recommended above, the quickest, cheapest and best way to move to a hybrid maize program would be to involve a hybrid corn company from Kenya or elsewhere. One model might be as follows:

- ◆ Representatives of SNS discuss with appropriate seed companies the possibility of establishing seed sales in Burundi.
- ◆ The ISABU maize program tests seed company hybrids at low, medium and high altitudes to speed identification of well adapted hybrids, and to encourage company to distribute only those that do well in Burundi [ISABU] tests.
- ◆ The hybrid maize company would produce its seed in its normal areas of production, using its regular equipment, to gain economies in scale. This would mean some import costs for the seed but these would be less than setting up a maize seed production operation and plant in Burundi. At some time, production in Burundi might become feasible, but not in the early years.
- ◆ The hybrid maize company should place a company representative in Burundi to organize and train a sales force, and develop a distribution system. He could develop a system of part-time dealers to sell seed corn. These might be leading farmers, school teachers, retired extension agents, or other persons respected in their communities, who might be interested in making some extra francs. I suspect six to eight persons would do to start,

with an eventual goal of one per commune. They would take orders, with payment due from the farmer on delivery. They would be paid a commission based on units sold. They should receive training in the characteristics of each hybrid available so that they could help farmers select hybrids best adapted to their farm.

This sales force model is not unique, but rather is the way hybrid maize seed is sold throughout the United States and in many other countries. Everybody has incentives in this system. Farmers get higher yields from the hybrid seeds. The local dealers get commissions based on sales. The country representative might be paid a salary, with bonuses or other incentives for high achievement of his sales force. And the company itself would make a return on its investment in research and production facilities.

The size of the Burundi maize seed market is not large by commercial standards but I believe it has sufficient size to interest one company. It might be large enough for two companies, eventually, as hybrid use increases. Some competition between companies might be healthy but I would start negotiations with the company that has hybrids best adapted to Burundi and which can develop the best distribution organization.

If I were the company, I would also sell some good composites. I would sell hybrids only to those farmers who will use fertilizer and lime or compost. They will be the farmers who will gain the largest responses from hybrids. I would sell composites to low-input farmers, since the seed will be cheaper and they will get less response, whatever variety they choose.

### C. **Sorghum**

I would talk to the maize seed company about hybrid sorghum seed. Most companies that sell hybrid corn also sell seed of hybrid sorghums. Here again, the ISABU sorghum program could test hybrids to identify those best adapted to the four sorghum eco-systems of Burundi. This would help the company select which of its varieties are well adapted to Burundi. Hybrid sorghum seed could be sold through the same sales system as maize.

### D. **Rice**

Most rice seed is currently sold by the SRD in Imbo. However private entrepreneurs are entering rice markets, so the private sector is likely to cover seed on its own. The persons with whom I have discussed this, including the ISABU rice program leader, are agreed that private involvement is already happening in rice seed. They believe that this will expand naturally and the system should be allowed to develop by itself.

### E. **Potatoes**

Potato seed production is rapidly moving towards privatization. Demand should rapidly expand for healthy potato seed. Yields are substantially higher, storage life is lengthened, and eating quality improved, when healthy seed is used.

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The participation of CIP in developing healthy planting stocks has helped the potato program install a multiplication system for disease tested seed. The Kajondi farm has expanded its production, along with its affiliated farms, and has ample planting stocks of the Ndinamagara variety.

This year the Kajondi farm has made arrangements with 80 contract growers to produce improved potato seed. Contracts call for growers to receive in advance, seed, fertilizer and pesticides on credit, to be paid for out of the seed crop. Growers are to return 75 percent of their crop for which they are paid an agreed price, after input credits are deducted. The other 25 percent they can sell as they wish. Indications are that most of this is sold as seed.

Two potato seed grower associations have been formed and are in their first year of operation. Training events have been held for growers.

These contract growers are, in fact, 80 private entrepreneurs who are selling improved potato seed in their local areas. This concept can be expanded to include growers in areas of Burundi not now included in the program. Other associations can be formed to accompany or to be affiliated with those now operating.

At some future time, it may become appropriate to form an overall association of the leaders of the local associations. This should not be hurried but should come naturally as growers become accustomed to participating in their local associations.

These contract growers and their associations form the key to developing private interests in seed potato sales. They can sell to farmers in their colline or commune. As Kajondi and the other seed potato farms expand their capacity, these growers can also expand their use, perhaps returning only 50 or 25 percent of their potatoes, and selling the rest locally as improved seed.

The seed farm must receive enough potatoes to cover input credits, overhead costs, and develop sufficient planting stocks for the next crop sales. The amounts needed will vary from season to season, but must be watched closely. The farm should have enough seed to meet the needs of contract growers, but not so much seed that it has huge carryover stocks to spoil and to cause financial losses, as could be the case this year.

One proven way to cover these risks is through "option contracts". In such a contract, the farm agrees to buy a given amount, say 50 percent of a farmer's seed crop [or a specified number of kilograms] at an agreed price. This price is usually set at some premium over the market crop price as of the day of delivery of the seed crop to the farm, or some other formula that ties the price to the time of crop delivery. In the same contract, the farm agrees to buy and the farmer agrees to deliver another portion, say 25 percent at the same price, if the farm requests it. The farm agrees to inform the grower by a set date whether it wants the additional seed. After that "option date" is past, the contract is over as far as that seed is concerned, and the grower can sell the crop as he/she sees fit.

Option contracts are widely used in the United States in grower contracts to reduce risks like those which may be faced by the Kajondi farm this year. In such contracts, you place "firm

contracts" with growers only for seed for which you have firm orders. You use options to cover seed you might need, in case of a poor crop, to cover larger orders than you anticipated, or just the risk you take in rapidly increasing a new variety. In United States, seedsmen use option clauses regularly in grower contracts. Growers tend to like option contracts, since if the option is called and the seedsman buys the additional seed as "basic seed", growers usually get a higher price than they could on other markets.

Pricing of seed potatoes seems to be a common topic of conversation when I was in Burundi. Much of this will fall away as private seed growers increase their share of sales, since prices will soon rise or fall to levels dictated by supply, demand, and cost of production. One implication is that the Kajondi farm must reduce its costs of production to levels that can be competitive with other basic seed sources, including its own contract growers.

## F. Beans

Active private markets exist for bean seeds at local levels, including the market shops and cooperatives of the countryside, as well as farmer to farmer sales. Improved bean varieties should become available from ISABU programs. However, a gap exists between the improved seed grown on ISABU and project farms, and the local private bean seed markets. The challenge is how to insert high quality seed of improved varieties into the active local trade in bean seeds.

One difficulty is the use of mixtures by farmers, rather than sole varieties. Innovative packaging in sealed multi-packs and selling techniques combined with superior varieties may help overcome this. Surveys on bean seed sales and use are presently being conducted by Walls and Smith, in cooperation with Louise Sperling of CIAT. I believe these should be completed before we move too far in developing strategies for privatizing bean sales.

However, several facts can give us direction. This year the SNS has 170 contract bean seed growers. Grower associations have been formed and are becoming operative. The growers received credit for seed, fertilizer and pesticides, while agreeing that the costs of these inputs be deducted from their seed crop upon delivery to SNS. A concern is that many growers did not return seed, and that others returned only enough to pay off the input costs. This a concern to SNS and its cash flow. However, it does have a positive side in that the seed not returned was probably sold privately as seed.

As in potatoes, it appears that these contract growers, individually and through their associations, are already part of a developing private market in bean seed. They are filling the gap between the basic seed farms and the local private markets of the *collines*. Further development of private seed growers should be encouraged. Certification of their seed can help them assure their customers of genetic identity and high seed quality. Distinctive packaging and labeling will be needed to carry the high quality label through to the farmer users. A "certified seed" label can be helpful as it becomes well-known and respected.

The marketing survey under way by Walls, Smith and Sperling should be followed closely as a guide towards improved marketing in bean seed.

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## G. The Role of Extension in Seed Sales

Under current practice, the seeds of most of the above crops are ordered by farmers through extension agronomes associated with the regional projects. These agronomes, in turn, place orders with the project leadership, which then orders seed from SNS or ISABU seed production. Some projects also apparently produce and sell their own seed.

Seed delivery is from seed farms to the projects, then to extension agronomes, and finally to the farmer. Some agronomes order enough seed to meet farmer needs. Others may not. Seeds sometimes arrive late, after key planting times have passed. Other inputs, including fertilizer, lime and pesticides follow the same path, with similar problems.

In several conversations with senior persons in the Burundi Ministry of Agriculture and Livestock, we were told that changes were being discussed for this system, to take the regional projects and extension agronomes out of input sales. This would free up more time for education, and for teaching farmers the merits of high quality seeds and other inputs for high yielding crops.

The private markets are developing now, despite the competition from input sales through the projects. These private entrepreneurs and markets should gain a big boost if and when the regional government projects cease competing in the input supply markets.

## H. The "Package Approach" to Input Distribution

Introduction of improved seed can be most successful as part of a complete input package. The most successful programs that I know of involve the simultaneous promotion and distribution of the total input package. This includes improved seed, fertilizer, pesticides, and lime or compost.

Farmers who plant seed on low fertility, acid soils will get little gain from the seed. Likewise, fertilizer does little good if the seeds are poor and soils are so low that aluminum levels are toxic. Using only one or two of these inputs wastes money, and rarely pays.

The successful farmers will be those who put together the whole package of high quality seed, sufficient seed, lime or compost to reduce soil acidity, and pesticides as needed. Their crops can improve dramatically. Yields and returns can be far greater than the costs of the inputs. This is the concept that has boosted farm economies in developed agriculture. I have seen enough good crops in Burundi to believe that this will work here.

Extension educators must play key roles in selling this "package" concept. They will gain in reputation and in satisfaction from doing so. Farmers who use the total package -- and, by doing so, substantially increase their yields -- will support and praise their extension agents. Farmers who add only one input and see little or no response will criticize them.

Seed dealers and growers also have reason to urge seed purchasers to use the total "package" approach. Those farmers who get high yields will be more likely to return for more seed in the next season. Those who use good seed, but starve their crop for nutrients, often blame the seed

for poor performance.

Unfortunately, lack of money may be the limiting factor for many Burundi farmers. Many exist at the edge of hunger, even starvation. Many must worry about money to buy today's food. Such farmers have no money to purchase improved inputs, no matter how much these could improve their crops at harvest time.

Input suppliers who are able can help farmers by providing credit for input purchases. These credits can be repaid from crop harvests. This can expand sales to farmers who could not otherwise buy inputs. However, it does not guarantee repayment and seed sellers must be paid if they are to survive. Some form of government backing for input credit loans to farmers may help assure input sellers of ultimate payment. One problem is the tiny scale that many of these loans would take.

## I. Private Seed Markets

Anyone taking an overall view of seed businesses in Burundi must recognize that most local seed activity is already in the private sector. Farmers are entrepreneurs and participate actively in most aspects of the local seed economy. As producers, they sell seed to relatives, neighbors, in local markets, shops and cooperatives. As buyers, the roles reverse, as farmers buy seed from relatives, neighbors, in local markets, shops and cooperatives, as well as from regional projects and SNS farms. And, of course, farmers often save and use their own seed when they feel this is profitable.

Surveys now being conducted by Walls and Smith are exploring this and will shed further light on local systems of seed marketing.

As implied above, surveyors find considerable local retail activity in seeds, again practically all in the private sector. This includes the market shops, which tend to buy and sell whatever they can to make a franc, as well as cooperatives, and local entrepreneurs, who may buy seed from farmers to re-sell in local markets.

Patterns vary between crops. The dividing line between seeds for planting and seeds to eat becomes faint or disappears, as some entrepreneurs sell bean, potato or other seeds for whatever use brings the highest price. Likewise, some farmers focus on buying high quality seed and are willing to pay higher prices to get good seed. Other farmers are not quality conscious or they cannot afford to be. They buy the cheapest seeds they can for cooking and planting.

#### IV. **Recommendations to USAID on Input Programs Related to Seed**

- A. Maintain Steven Walls in his position until the end of the SFSR Project. Walls is conducting surveys on farmer seed use and seed marketing that will be useful to Burundi in developing future privatization of seed activities. Walls is helping to set up a seed laboratory for the SNS and will be training the technicians to operate it. He is actively supporting the SNS in developing contract seed growers, regional seed storage facilities, and seed grower associations. He is also providing assistance to the SNS and the NSC on policy issues related to seed improvement.
- B. Expand the Burundian knowledge base on seed packaging, particularly for small packages. This should include the development of attractive, sealed packages or packets for seed, that can identify certified seed of improved varieties. Walls may be able to help with this before he leaves. Otherwise I would suggest an outside consultant, who can advise on packaging materials and equipment on a periodic basis. Persons with this expertise probably exist in Kenya, Zimbabwe, and/or South Africa. If not, they surely exist in the United States. Small packaging may also help in the distribution of fertilizers and lime.
- C. Provide an expert to advise the SNS on seed contracting matters. Walls has already started this process and may be able to have this sufficiently advanced before the end of the SFSR project. Otherwise, a consultant to serve for four to six weeks could help SNS in developing option contracts and other contracts to gain sufficient seed stocks, yet protect against over-production.
- D. With the CIP, consider whether equipment for packaging small lots of seed might be appropriate for inclusion in the PAAD.
- E. As noted earlier, encourage strong cooperation of ISABU plant breeding programs with the relevant IARCs, particularly ICRISAT and CIP.

**Annex 2**  
**List of Persons Contacted**

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Marketing Economist, SFSR Project  
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Jacque Debrabandere	Head of Belgium PASS Project
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