REGIONAL RECONNAISSANCE

OF

RWANDA, BURUNDI, KIVU PROVINCE OF ZAIRE

Final Report

APPENDIX: ABSTRACTS

This report is prepared on behalf of the United States Agency for International Development, under contract, by:

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INTRODUCTION

These abstracts of selected literature are topically arranged as listed below:

NOTE: As part of the reviewing process a computer search of the Commonwealth Agricultural Bureau data file was undertaken. Items which result from this search are designated C.S./CAB.ABS.

ANNOTATED BIBLIOGRAPHY OF SELECTED LITERATURE ON REGIONAL ISSUES IN RWANDA AND BURUNDI

GENERAL

Reuss, C. 1970. Le décollage économique du Burundi. Cahiers Economiques et Sociaux 8:609-49.
Title in English: "Burundi's economic take-off."
A general background description of Burundi is given with emphasis on the agricultural sector which provides 75 percent of the net domestic product. Future development should be partially based on further expansion and improvement in coffee, cotton and tea production, as well as increased food production for internal demand. Better co-operation between the two main ethnic groups appears to be a precondition for development.
SOURCE: C.S./CAB. ABS.

Rossi, G. 1979. Quelques problèmes morphologiques du Rwanda - Burundi. Etudes Rwandaises 12: 78-110.
Title in English: "Some geomorphological problems in Rwanda - Burundi."
Physical geography review of the relief, geology, soil and hydrology of Rwanda - Burundi. Maps of relief, geology, soil, hydrology system.

Rousseaux, R. 1966. La thésaurisation en milieu paysan au Burundi. Bujumbura: Université de Bujumbura, Facultés des sciences sociales.
Title in English: "Hoarding in peasant societies of Burundi."
Hoarding of money is possible in rural Burundi and Rwanda because the relative self-sufficiency of family farming units requires few cash purchases. The farms can therefore hoard marginal cash revenues. In 1963, rural peasants were hoarding sixty-three percent of all money in Burundi. The author suggests that the creation of the hoards can enhance the prospects of economic development in Burundi and Rwanda provided that they can be drawn into institutions (ie. banks) and used as a source of loans. Perpetual hoarding of money, however, impedes economic development.

Sirven, P.; Gotanegre, J.F.; and Prioul, C. 1974. Géographie du Rwanda. Brussels: A. de Boeck Editions.
Title in English: "Geography of Rwanda."
The authors present a comprehensive, integrated and clear description of the physical, human and economic realities of Rwanda. The text is supplemented with tables, maps and photographs and each chapter is followed by a brief summary.

Specific chapters address: relief, soil quality, erosion, the climate, vegetation, fauna and flora, population characteristics, agricultural production, acquisition of new lands, pastoralism, export crops, cities, industry, trade and development problems.

Stahn, E.; Gahungu, A.; and Krugmann-Randolf, I. 1978. Burundi-Trotz vieler Reichtümer ein armes Land. Entwicklung und Zusammenarbeit 8:9-15.

Title in English: "Burundi - despite great riches a poor country." After a brief historical account of Burundi and of the struggle between the Hutu and the Tutsi, the first short paper gives an account of its present stage of development and problems. Some 90 per cent of the population live by farming; coffee and tea are the main exports. About a third of the land is used for cattle and over-grazed under a non-economic traditional pastoral system. There is very little industry and Burundi is one of the poorest developing countries. The following two short papers discuss the main obstacles to development (population growth, scattered settlements making education and extension difficult, and widespread illiteracy), and plans to overcome them. These include improving the productivity of farming and livestock production, increasing basic education and higher education of leaders, the creation of transport and energy infrastructure, development of a health service, research and development of minerals. The final paper describes the activities financed by European development aid in Burundi.
SOURCE: C.S./CAB. ABS.

Technical Assistance Information Clearing House. 1976. Development assistance programs of United States Non-Profit Organizations: Rwanda. New York, USA: TAICH.
This report describes the programs of 13 private, non-profit U.S. organizations which provide development assistance and material aid to Rwanda. Financial data indicating program expenditures in 1976 (totaling $1,654,187) is available for 9 of the 13 U.S. organizations included in this report.

Technical Assistance Information Clearing House. 1979. Development assistance programs of United States Non-Profit Organizations: Burundi. New York, USA: TAICH.
This report describes the programs of 14 private, non-profit U.S. organizations which provide development assistance and material aid to Burundi. Financial data indicating program expenditures in 1978 (totaling $3,724,336) is available for 8 of the 14 U.S. organizations included in the report.

United Nations Conference on Trade and Development. 1980. Technical cooperation program for the external economic sector of the least developed countries. Geneva, Switzerland: UNCTAD.
This document outlines the work of the ITC (International Trade Center), which is a subsidiary organ of the GATT and of UNCTAD, in assisting the promotion of exports from developing countries and subsequently assisting import operations. Product development and export marketing have been undertaken with other UN agencies in (1) spices in Bangladesh, Comoro Islands, Nepal, Tanzania; (2) bee products for export in Burundi, the Central African Republic, Ethiopia, Mali, Tanzania and Upper Volta, and (3) medicinal plants in Burundi. Pilot training programs were carried out in Ethiopia, Somalia and Tanzania to help officials to see problems which they would face in carrying out export development plans for their organizations. This document is a detailed addendum to the general outlines of the document TD/B/AC 17/19.
SOURCE: C.S./CAB. ABS.

United States Agency for International Development. 1981. Annual Budget Submission. Burundi FY 1983. Washington, D.C.: USAID.
AID presence in Burundi is relatively recent. Their strategy has been to increase food availability, reduce the rate of loss of arable land to soil erosion, increase the availability of alternative energy sources and, finally, to improve the delivery of health and family planning programs. AID programs are now, primarily, agriculturally-oriented with a minimal amount directed to the exploration of peat as an alternative energy source. Future resources will be used to continue these programs as well as public health and family planning programs. Projects are designed to build the infrastructural/institutional network.

United States Agency for International Development. 1981. Annual Budget Submission. Rwanda FY 1983. Washington, D.C.: USAID.
The volume contains tables for projected costs of various continuing and recently proposed projects in Rwanda. The objectives of these projects are briefly reviewed. Area agricultural production, skills training and employment, technical, scientific and managerial training and a number of food distribution programs, undertaken in collaboration with two voluntary agencies, are described in detail.

It is projected that the size of the AID program for Rwanda will have almost quadrupled from current levels by 1983.

United States Agency for International Development. 1981. Country development strategy statement FY 83: Burundi. Washington, D.C.: United States International Development Cooperation Agency.
Description of positive and effective measures undertaken in recent years by the Government of the Republic of Burundi to mobilize economic resources and implement an economic development strategy based on agricultural production. Between 1975 and 1978, there was a 16 fold increase in investments for agricultural development. Reforms in education (with an emphasis on technical training) and health care were also undertaken. At present USAID remains a minor assistance donor in Burundi, with the exception of its role in assisting the development of peat as an alternative source of energy. The main objective of USAID in Burundi is to help resolve the land/food/population dilemma by: (1) increasing food availability to the rural poor, particularly in densely populated areas, (2) reducing the rate of loss of arable land to soil erosion and increasing the availability of alternative energy sources to the rural and urban poor, (3) improving the delivery of health and family services.

The document reviews (1) the economic condition of Burundi (GDP and inflation, structure of the economy and sectoral distribution, income levels, growth, macro-economic planning and foreign exchange, central government budget); (2) social condition (social structure, demographic structure, education, role of women); (3) condition of the rural poor; (4) causes of poverty; (5) process and commitment to development; (6) absorptive capacity (trained personnel, financial resources). The document also discusses the objectives/ strategy/funding of USAID and other donors in Burundi.

World Bank. 1981. Economic memorandum. The Burundian economy: Current situation and institutional constraints. Washington, D.C.: World Bank.
This document outlines policies based on the long term objective of decentralizing economic resources and decision making, improving efficiency of resource use, to make Burundi less vulnerable to developments outside its control. These policies presumably contribute to sustained development of the rural areas.

TRANSPORT PROBLEMS AND TRANSPORT LINKS

Magina, M. 1981. Burundi, past, present and future. Africa 117:39-40, 49.
General review of recent economic and political developments in Burundi. Discussion of the transport of Burundi's exports and imports. Burundi, like Rwanda, is landlocked and must rely on Uganda, Tanzania or Kenya for access to ocean ports. Transportation problems result not only from the deterioration of the physical infrastructure (roads, railway lines, transport vehicles) in Burundi, Rwanda and neighboring countries (due to the costs of maintenance) but also from poor management, poor intra-country coordination of product transportation, and recent political instability in Uganda and Tanzania. Because of the relatively low volume of traffic to and from Burundi (140,000 tons) and Rwanda (150,000 tons), these two countries have limited influence on transportation related policies of their neighboring countries.

Nduwayezu, J.D. 1979. Note sur le développement des transports routiers au Rwanda. Etudes Rwandaises 12:111-33.
Title in English: "Notes on the development of transport routes in Rwanda."
Roads are the primary mode of transportation within Rwanda. Discussion of natural and historical factors which prevented a more diversified transportation system: (1) natural factors - (a) unfavorable characteristics of rivers and streams for navigation (shallow-variable depths; steep beds causing many rapids, unstable sandy beds), (b) because of the nature of soils, the road system is literally paralyzed during the rainy season, (c) relief of Rwanda increases the costs of road construction (eg. the need to construct numerous tunnels); (2) historical factors - Until 1914, German colonial transportation policies sought to link Kigali to the Indian Ocean by way of naval transportation through the Nyabarongo and the Akanyaru as well as by railroad to Dar es Salaam. This objective was stifled under Belgian rule following World War I. The Belgians tried to integrate the road system of Rwanda into the Congolese road-transportation system which limited the development of both railroad and naval transportation.

By 1961, almost all the existing road system had been constructed. The road transportation program, established following independence, has consisted essentially of improving the local-communal road system. The density of roads in Rwanda is relatively high compared to other African states.

The number of vehicles increased sevenfold between 1964 and 1977 (from 1425 to 9320 vehicles - the largest increase being the number of pick-up

trucks and transport trucks). Three quarters of all vehicles are concentrated in urban areas (51% in Kigali alone). In 1978, 10% (978) of all vehicles were operated in the public sector.

The main transportation problems within Rwanda are rising costs due to (a) high cost of maintaining roads and vehicles; (b) underemployment of vehicles; (c) rising cost of fuel. In spite of the high costs, the improvement and expansion of the road system in Rwanda is essential for its economic development. At present, transportation related activities are the second highest source for credit.

Maps: 1) changing density of the road system 1914-1974.
2) density of roads 1974.

Sirven, P. 1975. Transports et urbanisation au Rwanda. L'Informateur de l'Université du Rwanda (June):25-36.
Title in English: "Transportation and urbanization in Rwanda."
In Rwanda, the development of roads did not favor the urbanization of the country, in contrast to the experience of other developing nations. The problem is studied in a historical, social and geographical framework.

Of the 4,000,000 inhabitants of this densely populated country, only 4% live in urban centers. Many reasons have contributed to the limited extent of urbanization, including limited economic opportunities in urban areas and traditional attachments to rural settlements.

World Bank. 1980. A report on the international transportation bottlenecks affecting Rwanda and Burundi, Volume I: Summary and recommendations, Volume II: Annexes. Washington D.C.: World Bank.
Review of programs and studies already underway as well as measures still required to improve the existing external export/import routes of Burundi and Rwanda. Many necessary measures are already being prepared or implemented, while a variety of short-to-medium-term measures are still required but should not necessitate any major investment. The most costly and lengthy improvements involve the railways, and even here preparational and actual work has already begun.

LARGE RESOURCE USE SYSTEMS

Bergeret, A. 1977. Ecologically viable systems of production - illustrations in the field of agriculture. Ecodevelopment News 3:3-26.
The first section of this article deals with complementary elements within the agricultural ecosystem: systems combining crops such as intercropping and agrisilviculture, game farming, the farming of complementary species of fish, and systems combining tree farming with stockbreeding. Complementary factors at work in some systems of production are then described: (1) an experimental combination of pastoral farming with agrisilviculture in equatorial Amazonia, which puts land to more intensive use than the ranching commonly practiced in the area and combines the European pioneer farming experience with local traditional methods; (2) an agro-pastoral project

underway in Rwanda, the Nyabisindu experiment, and analogous projects in Tanzania and Ethiopia; (3) the system of production outlined by the IITA in Nigeria, which involves the introduction of "zero tillage" techniques, the use of live mulch and the development of an appropriate range of equipment. SOURCE: C.S./CAB. ABS.

Welsh, J. L. 1980. Report on irrigation: Kagera River Basin. PRL Energy Analysis Company, under contract to United States Agency for International Development.
The report (1) summarizes and compares proposed projects for the irrigation of the Kagera River Basin, (2) undertakes a basin-wide assessment of irrigation, and (3) assesses previous reports.

The author suggests that the project proposed by Norconsult appears technically sound. It would irrigate 16,000 ha of rice, maize and soya bean by gravity canal after pumping from the Kagera River near Kakono. A centrally managed and operated irrigation system is deemed essential and mechanized farming is likely to be required to meet the cropping and irrigation schedules. Capital cost of irrigation system would be approximately U.S. $17,050,000. Operating costs with the Kakono dam and electric energy for pumping would be U.S. $1,314,000. Training for operation and management, and large scale training skills would have to be introduced into the area.

United Nations Conference on Trade and Development. 1980. Substantial new programme of action for the 1980s for the least developed countries. Potentials for least developed countries through sub-regional and regional co-operation agreements. Geneva, Switzerland: UNCTAD.
The problems of regional programs which involve joint exploitation of resources (e.g. lake and river basins) joint production or service enterprise or trade co-operation arrangements lead to questions of how consensus can be reached for sharing costs and benefits. Essential issues are the employment effects, the resource flows from such projects, the linkages they generate for further development, and the effects on each country's external sector development. Technical assistance support from multilateral donors should be provided to the least developed countries to enable them to objectively assess their interests in such co-operative arrangements. Among these are: (1) the Sudano-Sahelian agricultural recovery program; (2) Senegal river basin; (3) Niger river basin; (4) Gambia river basin; (5) Lake Chad basin; (6) Volta river basin; (7) Mekong river basin. Regional integrated rural development projects designed to bolster the agricultural potential of three regions are: (1) Rusizi Valley project, involving Burundi and Rwanda; (2) Northern Zambia and Southern Tanzania; (3) between Kenya and Ethiopia.
SOURCE: C.S./CAB. ABS.

LAND USE: TRADITIONAL AND NON-TRADITIONAL AGRICULTURAL SYSTEMS AND LIVESTOCK ISSUES

L'Afrique, continent agricole. 1980. Jeune Afrique 1015:63-70.
Title in English: "Africa, agricultural continent."

Although many African states have emphasized the importance of agriculture and the need to attain self-sufficiency in food production, there is a serious imbalance, with Africa importing large quantities of food and likely to require even larger amounts in the future. A regional analysis is given of cereal and vegetable production, food deficits, production of export crops, etc. Progress with respect to certain products is noted e.g. coffee in Rwanda, cocoa in the Ivory Coast. Nevertheless, more and more African countries have had to become food importers. Agro-industrial development is also discussed and examples provided of programs in particular countries.
SOURCE: C.S./CAB. ABS.

Autrique, A. 1979. La lutte contre les déprédateurs du cotonnier au Burundi. Coton et Fibres Tropicales 34(4):347-59.
Title in English: "Control of cotton pests in Burundi."
The main pests found on cotton during the course of 8 years in Burundi were Taylorilygus vosseleri (Popp.) (Lygus vosseleri), Aphis gossypii Glov. and Polyphagotarsonemus latus (Banks) (Hemitarsonemus latus) on the vegetative parts and Heliothis armiger (Hb.), Earias insulana (Boisd.) and Cryptophlebia leucotreta (Meyr.) on the reproductive parts; some 15 comparatively minor arthropod pests are also enumerated. Insecticides were applied on the Ruzizi Plain mainly as aerial sprays, 4-5 applications being made at intervals of 14-18 days between mid-February and early May. A list is given of 30 insecticides or insecticide mixtures applied in the area in 1970-77. In view of the order in which the pests appeared and of population development during the season, it is concluded that the aim of a treatment program should be to combine DDT (the standard treatment for the control of H. armiger) with a product effective against aphids and mites for the first 2 applications and with another product effective against Earias and Cryptophlebia for the last 2-3 applications.
SOURCE: C.S./CAB. ABS.

Baker, P.R. 1970. The introduction of rice in Rwanda. Journal of Tropical Geography 31:27-32.
Attempts to introduce lowland rice into the Nyabugogo valley, Rwanda, on otherwise uncultivated land are described. Except for one site at Cyangugu, it was not possible to grow 2 crops/year and paddy yields were low, 3.0 t/ha on demonstration plots and 3.28 t/ha on extension farms.
SOURCE: C.S./CAB. ABS.

Bart, F. 1980. Le Café dans l'agriculture rwandaise: L'exemple de Kidahiré (Runyinya). Les Cahiers d'Outre-Mer 33(132):301-17.
Title in English: "Coffee in the agriculture of Rwanda: The example of Kidahire (Runyinya)."
Arabica coffee, the most important export product of Rwanda, is a strictly government controlled crop. It is cultivated in small family plots. The production system employs rudimentary technology and the yield is rather low but coffee is the most frequent money making crop among the peasant families. Three typical examples of rural families are presented to better illustrate the importance of coffee crops at the family level.

Capecchi, B. 1976. Teza, une grande exploitation théière au Burundi Les Cahiers d'Outre Mer 29(115):271-301.
Title in English: "Teza, a major tea plantation in Burundi."
Principal physical characteristics of Teza, a major tea plantation in Burundi, are described. It reviews successful technological adaptations to marginal climatic and pedological conditions. Initial division of the plantation among peasants was inadequate; eventually, the national government undertook the management of the plantation. Revenues remain a meager supplementary source of income for local workers. Future prospects for the development of tea plantations in Burundi are limited.

Cazenave-Piarrot, A. 1975. Les paysannats de la plaine de la Rusizi au Burundi Les Cahiers d'Outre Mer 28, 275-92.
Title in English: "The peasant settlement schemes of the Rusizi Plain in Burundi."
The Rusizi Plain was for a long time inhospitable, infested by tsetse and habitat for a large number of elephants and buffalo. Government programs during the 1950's and 1960's (spraying of insecticide, draining of marshes, hunting and reducing populations of large animals) enabled the immigration of peasants to the Plain. Cotton and rice farming are the main activities of the region. The objective of government authorities is to reduce demographic pressures on inland regions by encouraging migration to the Rusizi Plain. The social and economic condition of the peasants in the Rusizi region are described. The article describes measures undertaken to improve these conditions.

Delepierre, G. 1975. Les régions agricoles du Rwanda. Bulletin Agricole du Rwanda 8(4):216-25.
Title in English: "The agricultural regions of Rwanda."
Three main climatic zones are distinguished. In the tropical lowlands, groundnuts and cassava are the main food crops; there are possibilities for extension of livestock farming. Between altitudes 1,500 and 1,900 m beans and sweet potatoes are cultivated, with arabica coffee as the main cash crop. In the mountain regions, crops such as Irish potato and peas are grown; cash crops are cinchona, tea and pyrethrum.
SOURCE: C.S./CAB. ABS.

Delepierre, G. 1979. Pour une meilleure prècision de la force de travail disponible par exploitation agricole traditionnelle. Bulletin Agricole du Rwanda 12(4):200-205.
Title in English: "Towards a better definition of the labor force available for traditional agriculture."
This article completes a 1978 study on labor supply and use on the traditional farm. The rural family in Rwanda has an average of 4.97 people, three of whom are engaged in agriculture, equivalent to 2.2 units of agricultural manpower (UTA) per year. The labor capacity of the average Rwanda

family farm is equivalent to a head of farm household less than 55 years old working 1800 hours (300 days of 6 hours each). The farm as a whole (on the basis of 2.2 UTA) has available 4000 working hours a year.
SOURCE: C.S./CAB. ABS.

Deschuytener, G. 1974. La question des exportations de viande au Rwanda. Bulletin Agricole du Rwanda 7(4):281-83.
Title in English: "Rwanda's meat-export problem."
Rwanda's export of live animals to surrounding countries, mainly Zaire, amounts to more than 50,000 head of cattle, sheep and goats altogether. However, the exported animals are of low weight. The economy and marketing possibility related to producing prime beef for export and using lower grades for home consumption are discussed.
SOURCE: C.S./CAB. ABS.

Deschuytener, G. 1975. Aspects techniques et économiques de l'élevage du porc au Rwanda. Bulletin Agricole du Rwanda 8(1):8-13.
Title in English: "Technical and economic aspects of improved pig production in Rwanda."
Over the past 10 years, pig production has gained importance in Rwanda. Development and techniques need improvement, adapted to smallholder conditions. Local conditions are favorable, sources for balanced pig rations are available and exotic breeds grow well. A precondition is, however, an increase in prices to make economic production possible. Detailed attention is paid to market price, methods of rearing, economic aspects and national interest in industry.
SOURCE: C.S./CAB. ABS.

Etude de cas de programmation régionale: Esquisse de programme de développement rural intégré pour la préfecture de Butare, Rwanda. 1978. Dovala, Cameroon: Institut Panafricain pour le Développement, Région Afrique Centrale Francophone.
Title in English: Case study of regional planning: Outline program for integrated rural development in Butare prefecture, Rwanda.
The paper describes the situation in the Butare region of Rwanda. Butare has the highest population density in Rwanda, and suffers from regional disparities within its area, under-employment, (partly because of the small size of family holdings and the absence of diversified rural activities), inadequate education and training, etc. The paper goes on to suggest solutions, e.g. increased agricultural productivity, better use of available land, changes in the rural education system, etc., and outlines an integrated rural development program considering the area zone by zone and specifying objectives, methods and resources.
SOURCE: C.S./CAB. ABS.

L'évaluation de production de différentes cultures vivrières du Rwanda. 1976. Bulletin Agricole du Rwanda 9(3):171-77.
Title in English: "The evaluation of staple food crop production in Rwanda."
Graphs and data relating production costs, producer prices and returns are presented and analyzed for beans, sorghum, peas, potato, groundnuts, sweet potato, cassava, and soybeans.
SOURCE: C.S./CAB. ABS.

Gahamanyi, L. 1977. Politique nationale agricole. L'Informateur de l'Université du Rwanda (March):43-50.
Title in English: "National agricultural policy."
The secretary of the Ministry of Agriculture describes facts and problems of agricultural policy in Rwanda. Recognizing the particular importance of agriculture in the economy of Rwanda, an objective of 5% annual increase of production is set, along with more specific objectives and guidelines for the development of agriculture. The evolution of food production from 1976 to 1981 is examined together with specific issues including the anti-erosion fight, the use of organic fertilizers, and the rotation of crops.

Gibbons, C.A. et al. 1974. The problem of collecting data on food production and farming in African economies. Notes and Papers in Development No. 10. Comox, Canada: Peter McLaughlin Associates.
The introductory chapter, by C.A. Gibbons, on basic statistical problems in evaluating the national food supply in African economies, indicates some of the fundamental conditions which make such statistical evaluation even more difficult in Africa than in other parts of the world. For adequate appraisal, the two main requirements are a recent food balance study and several food surveys, both of which are extremely costly, and do not give enough data on consumption patterns within households. D.C. Catt and R.G. Hankin contribute a paper on practical problems of measuring food production and conducting nutrition studies, primarily discussing difficulties of obtaining data at the grass roots level, and based on work done for the Government of Malawi. The discussion is confined to methods for measuring food crop production and food consumption, viewed within the general context of development planning, but is relevant to studies of cash cropping and other aspects of rural activity. J.D. MacArthur examines food data in African economies, with examples from Kenya. The paper indicates the problems encountered in collecting such data, describes some of the forms of data that are either sought or actually produced in African countries, and assesses the adequacy of available information in meeting the needs of those government agencies that must try to formulate and execute food policies. It is likely that African Governments will continue to have available only piecemeal data on their national food situations, and can expect no real improvement for several decades. P.B. Gravel gives an anthropologist's view, in a paper on culturally determined informant bias in food production investigation, based on field work in Rwanda.
SOURCE: C.S./CAB. ABS.

L'intensification de la production des petites exploitations agricoles au Rwanda. 1976. Bulletin Agricole du Rwanda Part 1. 9(3):151-57. Part 2. 9(4):278-80.
Title in English: "Intensification of smallholder agricultural production in Rwanda."
Erosion control, reforestation and intensification of agricultural production have been the main national agricultural strategies in Rwanda since 1973. Achievements obtained and the problems which had to be solved during the years 1974 and 1975 are outlined with particular attention to the supply of seeds and other planting materials, application of fertilizers, mixed farming, training of extension workers, development of co-operatives and credit facilities, storage and marketing systems.
SOURCE: C.S./CAB. ABS.

Kagina, A. 1976. L'horticulture au Rwanda. Bulletin Agricole du Rwanda 9(4):274-77.
Title in English: "Horticulture in Rwanda."
About 225 ha are under intensive horticulture, with some 25 ha of carrots, french beans, leeks and eggplants for the city market of Kigali. The major area, however, is used for the production of vegetables, ornamentals and the medical plant Vinca minor for export. During the winter months of 1975-76, about 600 tons of vegetables, principally sweet pepper and chili pepper, were exported to Europe by air.
SOURCE: C.S./CAB. ABS.

Kamanda, L. 1979. Landwirtschaft und Entwicklung in Zentralafrika. Entwicklung und Zusammenarbeit 20 (4):8-9.
Title in English: "Agriculture and development in Central Africa."
The article is a stocktaking on development in Central Africa at the end of the second development decade, mainly dealing with Burundi, Rwanda and Zaire. Although the large majority of the population are employed in agriculture the emphasis in development and investment has been on urban problems and on industry so that there has been an increasing flight from the land of young people. None of the three countries has the co-ordinated fiscal and transportation policies which provide the essential basis for agricultural development. Little development aid or foreign investment has gone into agriculture except into breeding and cultivation aspects of export crops. Priority has to be given to research in agriculture and to developing appropriate transport networks in each country if these problems are to be overcome.
SOURCE: C.S./CAB. ABS.

Kayondi, C. 1972. Murunga, colline du Burundi: Etude géographique. Les Cahiers d'Outre Mer 25 (98):164-204.
Title in English: "Murunga, a hill dwelling in Burundi: A geographic study."
A physical and social geographic case study of an area located on the edge of the Congo-Nile range. Altitude of more than 2,000 m; cool and

wet climate - irregular seasonal rainfall; natural vegetation diminishing due to high population density (140 inhabitants/km^2). The economy of the hill is based on a combination of agriculture and animal raising. The area is divided and cultivated by numerous families but pastures are used on a collective basis. Three annual harvests are possible, but intensive use is reducing soil productivity, in spite of some use of dung as fertilizer. Animals are raised more for traditional than economic reasons. Few activities provide cash revenues.

Leurquin, P. P. 1963. Agriculture change in Rwanda-Urundi 1945-1960 Studies in Tropical Development. Stanford, USA: Stanford University. Food Research Unit.

"Summary food production per head has remained stable (in Rwanda and Burundi) during the last fifteen years. In spite of demographic pressure, amounting to an increase in population of almost a half, the country did not experience famine between 1945 and 1960.

"The most important changes have taken place in the field of export crops; coffee and cotton have made rapid progress.

"Food crops have benefited indirectly from the use of insecticides, whether from the campaigns against insect pests in native huts, or the dusting of coffee and cotton; they have profited more directly from the new seeds introduced by INEAC and from the opening up of new districts through colonization and marsh drainage. Anti-erosion measures and reforestation will have more long-term effects.

"In spite of the improvement in the transport network, marketing of local products has made little progress, too little at any rate to serve as the basis of a prosperous agriculture. Marketing organizations have played an important part in the expansion of coffee and cotton growing. The same is true of the co-operatives which have been fostered by the state. Livestock production progresses but slowly, despite persistent efforts. Vaccination has banished grave epidemic diseases such as cattle plague, anthrax, and sleeping sickness, but it has not been able to cure the endemic diseases, of which the most grave, cysticercosis, deprives the affected animals of all commercial value."

Lowe, J.W. 1977. The IFC and the agri-business sector. Finance and Development 14(1):25-28.

The International Finance Corporation is an affiliate of the World Bank which provides finance for private sector projects in the developing countries. Since 1964 the IFC has been taking up equity positions in agribusiness ventures up to about 10% of its total financing. During the fiscal year June 1975-76 the record figure of $15.2 million was committed for five enterprises: coconut oil processing in the Philippines, vegetable growing in Senegal, tea growing in Senegal, tea growing in Rwanda, and two sugar projects, one in Ecuador and the other in Nicaragua. The IFC's experience shows that with the growth in the use of large amounts of capital equipment for successful agribusiness, its own ability to provide longer term equity finance is becoming more important, especially as local sources tend to be inadequate for ventures which may suffer short-term losses. The more highly processed or refined the final product is, the less likely the project is to

suffer from volatile prices, while greater value is added to the product and the profitability of the operation can be increased.
SOURCE: C.S./CAB. ABS.

Mafura, A. 1978. Rwanda. In Rice in Africe ed. I.W. Buddenhagen and G.J. Persley. London: Academic Press.
The total rice area is 1000 ha with an av. yield of 2.3 t grain/ha. Two crops of irrigated rice/yr are grown. Traditional crops are Kihogo, Burgara and Sifara with 150-170 days growth duration and long fine grains; they are disease resistant.
SOURCE: C.S./CAB. ABS.

Meuer, G. 1978. Eco Farming: Herausforderung des Agro-Business mit einem Überlebensmodell. Entwicklung and Zusammenarbeit 19(4):9-11.
Title in English: "Eco farming: A challenge of the agro-business by a survival model."
The "Project Agro - Pastoral" at Nyabisindu in Rwanda deserves a high degree of publicity as it is a model of a true alternative to the basic tenets of AgroBusiness. Having seen this project the author stated that this might be the way to feed growing populations in the Third World without the high technologies and energy input of the "Green Revolution." He calls it a reason for optimism and says that is is a real scientific-agricultural technological alternative, but that only the future can show if it is politically and economically viable.

The project began as an orthodox technical assistance project, led to improvement of milk production, veterinary services and finally to an overall system of feed production. Steep fields had been previously exhausted under cultivation. Erosion barriers were planted and new humus layers between these barriers were set up. At Nyabisindu this was achieved by planned "chaos", the mixed growth of local crops and weeds. When rotted, these plants produced a 20 cm humus layer that also conserved humidity. This method maintained an ecological balance without the use of insecticides and pesticides. Forest lots were also planted to create shade, stabilize the soil, bring minerals from deeper soil layers and produce firewood. Reforestation used an old custom which was suppressed under the kings and the Belgian colonial administration. Under this custom, the village works on a community project one day a week. In this way the nurseries have produced 60,000 seedlings for an input of 300 man days per year. The seedlings are given free to the farmers who have assisted in the work. In the region demand is filled and other areas are becoming interested in the operation.

Neel, H. 1979. Situation de la recherche agronomique dans le cadre du développement agricole du Rwanda. Bulletin Agricole du Rwanda 12(3): 132-34.
Title in English: "Agricultural research in the framework of agricultural development in Rwanda."
The article begins by examining the record of agricultural development and research in Rwanda. Research is fulfilling its role by producing high

quality crops and livestock, and developing production techniques to attract the peasant farmer, but peasant farmers are not responding to the spectacular results of research. Research results need to be presented in a comprehensible form, and by people who inspire confidence. Extension can perform this function, but the peasant farmer will still not respond without an improved marketing structure, and attractive price policy. Consumer goods must be available to attract this rural purchasing power and encourage farmers to produce for the market. Farm households need to be encouraged out of the attitude that their own self sufficiency is all that is needed. Agricultural development is a complex problem requiring agricultural research, extension, education and marketing. Research is the easiest of these to accomplish, which is perhaps why it is most easily criticized.
SOURCE: C.S./CAB. ABS.

Nwafor, J.C. 1977. Constraints on agricultural planning and development in Rwanda: An overview. African Environment 2/3(4/1):87-96.
In Rwanda the need for economic growth is urgent and agricultural planning must be the central part of any development program. The land is currently supporting four times its optimum population under traditional cultivation methods. The serious need for a broad program of agrarian reform is recognized and national authorities supported by international efforts have been directing attention to increasing food production relative to the growth of population. High priority has to be accorded to lowering the birth rate, without which even a successful agricultural program will do no more than stop the decline in per capita income. Planning must be geared to local needs, environmental factors and socio-economic conditions.
SOURCE: C.S./CAB. ABS.

Nwafor, J.C. 1979. Agricultural land use and associated problems in Rwanda. Journal of Tropical Geography 48:58-65.
In size and economic output Rwanda is one of the smallest states of Africa, with the highest population density in the continent. The resource base is relatively weak, and the economy is predominantly rural, with farmers making up 97% of the population and 87% of the cultivated land occupied by subsistence crops. The settlement pattern consists of small, traditional dwelling units dispersed on hills and is so devoid of nucleation that there are no villages in the accepted sense. This is due to mountainous terrain and deep, uninhabited, swampy valleys. There is a serious overpopulation problem, with severe land shortage, giving rise to intensive land use. The present agrarian system is no longer adequate, and since Rwanda cannot survive on subsistence production alone a broad program of agrarian reform is essential. This has been recognized by the Government, which is directing more attention to increasing food production faster than the increase in population. Priority must also be given to family planning, since unless the birth rate is curbed all efforts towards agricultural development will do no more than stop the decline in per capita income.
SOURCE: C.S./CAB. ABS.

Préfol, B., and Delepierre, G. 1975. Disponibilité et utilization des terres au Rwanda. Bulletin Agricole du Rwanda 8(2):115-25. Part A, 8(1):58-63. Part B, 8(4):277-93. Suite annexes, 9(1):56-60.

Title in English: "Availability and use of land in Rwanda."
Fifty-five percent of peasant families (rugos, average size of 5 members), cultivate less than 1 hectare of land; 40 % cultivate between 1.0 and 1.5 hectares of land; 6% cultivate more than 1.5 hectares. Four characteristic types of land use are identified. 60% of the land area of the rugo is designated to food crop production; 20% of land is left to fallow; 8% is for residential use (including small gardens); 3% of land is used for cash crop production. Data for land use, crop production and consumption and demographic trends are disaggregated to the ten prefectures of Rwanda. On the basis of production and demographic trends, three hypothetical projections (pessimist, optimist, middle) of Rwanda's development are reviewed. It is suggested that the prospects for Rwanda's development are dim unless demographic growth can be controlled, i.e., by means of effective family planning policies.

Reintsma, M. 1981. Land tenure in Rwanda. Paper prepared for USAID. Kigali: USAID Rwanda.
An overview of the de jure and de facto land tenure situation in Rwanda.

The land tenure system in Rwanda is complicated due to the confusion which has developed from the imposition of a colonial legal system on the customary law system, which itself varies depending on the tribal history of the area. Post-colonial land tenure legislation (1976) is still developing and has not yet systematically resolved inconsistancies.

The current land tenure pattern in Rwanda is characterized by small land holdings which were caused by an overall shortage of arable land. The self-motivated migrations of farmers and the paysannat schemes that were organized by the government with foreign aid funding encouraged resettlement in less populated areas and helped alleviate the problem of land scarcity. The author proposes agrarian reforms based on a codified system of land tenure laws that would limit the subdivision of holdings below a minimum economically viable size, consolidate scattered plots, and intensify production.

Savoie, P., and Kabay, M. 1980. Choosing optimum application rates in developing countries. American Journal of Agricultural Economics 62(4): 734-36.
Using agronomic data, simple statistics and elementary economic theory, the paper presents a method for optimizing application rates and for estimating the probability of success or failure in implementing new techniques in a peasant economy. An example using seed density of Saxa dwarf beans in Rwanda is presented, but the same method could be applied to other crops and treatments. Results of the study indicate that if actual seeding practice is 40 kg/ha, an extension program recommending that farmers increase their seed density to 90 kg/ha would have a good chance of succeeding; the likelihood of exceeding the expected worst profit at the lower density of 40 kg/ ha is 92% and the likelihood of doing better than a farmer using 40 kg/ha is 69%.
SOURCE: C.S./CAB. ABS.

Sylvestre, V. 1974. Implantation et développement d'une coopérative rurale multifunctionelle au Rwanda. Archives Internationales de Sociologie de la Coopération et du Développement 36:75-106.
Title in English: "Establishment and development of a multi-functional rural co-operative in Rwanda."
Rwanda has the densest population of any country in Africa, with about 1 ha cultivable area per family of five. In 1951 paysannat centers were created in the least populated areas, of which the co-operative was to be the final stage. This article describes the setting up and development of one of these co-operatives, Masaka, from its creation in 1968 to 1973, when it was handed over entirely to its members.
SOURCE: C.S./CAB. ABS.

Vennetier, P. 1978. Une 'micro-réalisation' de développment agro-artisanal au Rwanda. Les Cahiers d'Outre-Mer 31 (123):209-24.
Title in English: "A small scale agro-technical project in Rwanda."
Located in the vicinity of Butare, Rwanda, the Konfigi is a cooperative association growing fruit and making preserves, which are sold in the country's urban markets. Its activity is modest but its real significance lies in its small size and the small amount of capital that was required to found the business. In spite of some difficulties, it has succeeded in operating successfully for a dozen years. Its members have a monetary income which traditional agricultural activities would have been unable to give them.

Wiens, R. 1975. Probleme des Genossenschaftlichen kleinbäuerlichen Teeanbaus in Zentralafrika. Tropenlandwirt 76:90-94.
Title in English: "Problems of co-operative smallholder tea growing in Central Africa."
The general situation of tea-growing in the countries of Burundi, Rwanda and the Kivu province of Zaire is explained and existing forms of tea cooperatives are described. The economic, technical and sociological character of the problems of cooperative/small-holder production are discussed.
SOURCE: C.S./CAB. ABS.

ENERGY AND ENERGY RELATED RESOURCE USE ISSUES

Karenzi, P. 1979. Les plantes à latex peuvent-elles nous être de quelque utilité au Rwanda? Etudes Rwandaises 12(2):91-96.
Title in English: "Can rubber plants be of some use in Rwanda?"
Recent discoveries of the possibility of fuel production from rubber trees stimulated a research project undertaken by the Center for the Study and Application of Energy issues of Rwanda. The project examines whether or not the rubber extracted from Umyenzi trees (which are abundant in Rwanda) has the desired properties for energy production. The results are preliminary and inconclusive.

Klock, T. E. 1980. Study of the potential for developing nine small hydropower schemes in Rwanda. Washington, D.C.: USAID/PRC Energy Analysis Co.
A cost/benefit assessment of nine small hydropower project proposals suggests that small hydropower schemes could not adequately supply Rwanda's projected energy requirements. Instead, Rwanda should undertake the development of the Rusumo Falls Project.

Reintsma, M. 1981. Energy in Rwanda. A synopsis. Paper prepared for USAID. Kigali: USAID Rwanda.
A synopsis of information available on the energy situation in Rwanda. Past and planned development is summarized as: 1. wood and hydroelectric power, the most widely used energy sources; 2. methane gas and peat, the most important potential sources of energy; 3. smaller new and renewable sources of energy such as solar power and biomass. This summary also includes supply and demand estimates. The role and contributions of government policy and foreign aid are also considered. An annex briefly reviews the issue of imported fuels and their competitiveness with indigenous energy sources. A comprehensive bibliography of Rwandan energy issues in included.

Suleiman, A. A. 1981. Burundi's solution may be found in a peat bog. New African (August):35.
Production of peat in 1979 in Burundi was about 9,200 tons. Production is expected to reach 36,000 tons by 1981. The market price of peat is about 1/6 that of charcoal but produces about half the caloric value (heat). Several programs have been introduced to encourage the use of peat, particularly in Bujumbura. USAID has contributed a grant of $490,000 for a pilot project to develop peat resources and encourage its consumption.

DEMOGRAPHIC ISSUES

Boynton, W.H. et al. 1981. A report on assistance to develop a national maternal and child health and family planning program in Rwanda. Paper prepared for USAID. Washington, D.C.: American Public Health Association.
This carefully detailed and complete paper commissioned by USAID reports a possible format and implementation plan for family planning and maternal and child health care in Rwanda. It begins by examining current demographic, population and other pertinent statistical characteristics and, as it does throughout the report, offers recommendations for improving the quality of Rwanda's vital statistics, censuses and surveys and their application. Example forms and charts are included.

This paper also examines current government policies and programs and available resources and provides as well as a Rwandan social analysis--how colonial rule, traditional social structure, male-female relationships and other factors will affect the implementation of any program.

Finally, a detailed implementation strategy is offered including kinds of domestic/foreign-based, long and short term training programs, the institutes qualified for these purposes, and a list of practical resources for direct implementation.

A context is offered, then, of larger technical, statistical issues in which any regional plans may be set up. "The project will provide...primary health care...a national family planning program...technical assistance to ONAPO...the collection and analysis of data for evaluation...The need for population control--a result of land pressure--is widely recognized by both high officials and the population at large...The ONAPO can organize the demographic, economic, statistical and sociological studies required for informed management, if it receives the recommended assistance."

Dubois, V. D. 1973. Population problems, perception and policy in Rwanda. American Universities Field Staff Reports: Central and Southern African Series 17 (2).
Rwanda, given its present growth rate, is rapidly becoming seriously overpopulated. During the colonial period population pressures were checked by labor migration to neighboring countries. At present, not only has this migration diminished, but the government was unwilling to adopt family planning policies due to social, psychological, religious and political motives that are particularly strong in this country.

McCook, A. S. 1980. Population and nutrition in Burundi, Rwanda and Zaire: Problems and recommendations. Washington, D.C.: One America Inc.
The report reviews some of the principal demographic and nutritional concerns of the Great Lake countries, discusses survey findings concerning family planning and the status of women in the region, and identifies policies and programs designed and implemented to reduce fertility and improve nutritional levels. Finally, it proposes recommendations for improving the population-food balance in the region.

Robatel, J.P. 1974. Les problèmes de population au Burundi. Faculté des Sciences Economiques et Sociales de l'Université du Burundi (Bujumbura) et le Pathfinder Fund (Boston, USA).
Title in English: "Problems of population in Burundi."
Report on a survey of 2,400 women in different socio-economic strata in two regions of Burundi (Bahanza and Ngozi). The survey assesses the women's knowledge, attitudes and use of family planning methods - particularly the spacing of births.

Sirven, P. 1979. Note sur la croissance urbaine de Kigali Etudes Rwandaises 12:134-47.
Title in English: "Note on the urban growth of Kigali."
Review of Kigali's development under the German and Belgian colonial rule. An accelerated rate of population growth and an increased level of job creation masked Kigali's emergence as a major urban center in the period following independence (1962). Between 1962 and 1970, Kigali's population increased by 484%. From 1970 to 1978, it increased again by another 117% - for a total population of 117,749 (1978) - an average annual growth rate of 9% (3% per year natural growth rates and 6% immigration by a young, adult [20-35 years old], mainly male population, single or temporarily separated

from their families to seek employment). Kigali's population growth rate is considerably larger than the general rate of growth of the country (2% to 3% annually). Kigali has a relatively high employment rate for an African city; 76% between the age of 15 to 60 are employed (of a total work force of 67,089, 33,000 are employed in the tertiary sector, 8,500 in the secondary and 10,000 in the primary [agricultural] sector).

Sledsens, G. 1972. L'explosion démographique au Rwanda: La place du planning familial. L'informateur de l'Université Nationale du Rwanda 7679. Boston, USA: Pathfinder Fund.
Title in English: "The demographic explosion in Rwanda: The role of family planning."
Fifty percent of the population of Rwanda has yet to reach the age of 15 (1971). The main cause of demographic growth has been the decrease in infant mortality due to improved health care. Preliminary surveys of attitudes towards the preferred number of children per household suggests that little is being done by Rwanda's government to curb birth rates, i.e., by informing the population of the consequences of continuing population growth. According to the surveys, when the population was informed about demographic trends and their consequences in terms of pressures on limited resources, up to 60% of the respondants suggested that they would prefer to have smaller households. It is suggested that the appropriate contraceptive methods for Rwanda are intra-uterine devices and intra-muscular injection.

Speed, D. E. 1970. Population crisis in Central Africa: Rwanda and Burundi. In Health and disease in Africa, the community approach: Proceedings of the East African Medical Research Council Scientific Conference, Nairobi, Kenya 1970, ed. G. C. Gould, pp. 243-46. Nairobi. East African Literature Bureau.
The indigenous population of Rwanda and Burundi consists of three ethnic groups: 85% Hutus (mainly agriculturalists), 14% Tutsi (pastoralists), 1% Twa (pygmies). There is no village organization in either Rwanda or Burundi. In all ethnic groups, each family lives on a plot of land it owns or cultivates with no social or communal life. This social fragmentation constitutes the biggest hurdle to any progressive development in Rwanda and Burundi. The article describes the marginal infrastructure for health care, education, and vulnerability of the population to low rainfall years. It suggests that deep seated cultural values encourage high birth rates. For example, it is believed that it is essential for the family to compensate for high infant mortality rates by producing a large number of children. It describes the main causes of maternal and infantile mortality and contains a general discussion of malnutrition. The rate of population growth in Rwanda and Burundi can not be solved by "death control"; controls on fertility through the introduction of family planning programs is necessary.

Tsui, A. O. 1979. Illustrative functional projections 1975-2000: Burundi. Chicago, USA: The University of Chicago. Community and Family Study Center.
Projections on future requirements of various societal sectors (including

education, the labor force, health and medical facilities, food, family planning programs) based on a linear model of population growth and economic development in Burundi.

United Nations Fund for Population Activities. 1979. Burundi: Report of mission on needs assessment for population assistance. Report No. 27. New York, USA: UNFPA.

This is a report in the same series as the UNFPA report on Rwanda abstracted below and discovers similar population issues for this country, which faces the same kind of pressures under similar circumstances.

Population research problems are examined- types of questionnaires issued, their responses, social influences, and recommendations for future research possibilities. A proposed formula for a national population policy is also recommended, particularly dealing with fertility and spatial distribution. The implementation of this plan within the existing health infrastructure through information systems and education is suggested.

Finally, the paper includes external assistance and its effect as well as annexes that include a table of demographic indicators, population density, and a summary of a 1970-1971 demographic survey.

United Nations Fund for Population Activities. 1979. Rwanda: Report of mission on needs assessment for population assistance. Report No. 26. New York, USA: UNFPA.

This is a report of an extensive programming exercise responding to the population assistance needs of Rwanda. Low per capita income and high levels of infant, child, and maternal mortality, high fertility, and heavy population pressure on arable land demonstrates the need for such programs.

The report summarizes basic demographic, geographic, administrative, and socio-cultural features.

Vis, H.L. et al. 1975. The health of the mother and child in rural Central Africa. Studies in Family Planning 6(12): 437-41.

Within the framework of a public health program, the Medical Mission of the Medical and Scientific Center of the Universite Libre of Brussels in Central Africa and the Institute for Scientific Research in Central Africa have studied the relation between fertility and malnutrition in part of the Great Lakes Region of Central Africa (Kivu, Zaire, Rwanda). In this area, health is influenced by three conditions: (1) a subsistence economy; (2) an annual population growth rate of nearly 2.6%, with population density ranging by region from 110 to 130 persons per square kilometre; and (3) environmental sanitation of poor quality and low efficiency. Largely because of these factors, the population suffers from a state of profound proteo-caloric malnutrition. Periods of near famine occur. This paper summarizes findings of several studies on food consumption in Central Africa and, against this background, examines some results of longitudinal studies of several groups of pregnant women and nursing women and their babies conducted in mother and child health centers. The collection of information on the nutritional state of mother and infant and on the development, morbidity, and mortality

of children is one of the primary goals of the public health program in this area. Improvement of maternal nutrition would lead to rapid consecutive pregnancies, reducing the protein available to each child. Modern birth spacing methods, in combination with programs to improve the health of mother and child, are recommended.
SOURCE: C.S./CAB. ABS.

ENVIRONMENTAL MANAGEMENT ISSUES

Biroli, P. 1980. Effort de reboisement au Rwanda. Bulletin Agricole au Rwanda 13:24-29.
Title in English: "Reforestation in Rwanda."
Review of reforestation policies of Rwanda since the 1920's. Description of present efforts by the Ministry of Agriculture and Husbandry towards reforestation. The principal causes of deforestation in Rwanda are reviewed (lack of adequate sensibility and education to the use of forests, changes in government policies). Estimations of present demand for wood for heating and construction and the available supply of wood suggest a significant shortage of wood for consumption.

Budowski, G. 1976. Propositions pour un programme de sauvegarde de la Forêt de Nyungwe. Bern, Switzerland: Coopération Technique Suisse.
Title in English: Recommendations for the preservation of Nyungwe Forest, Rwanda.
This report discusses the value of Nyungwe Forest, the most extensive in Rwanda, for scientific, educational and tourist use and for the hydrological regime of the area (which is mountainous and liable to erosion when the forest is removed). It is recommended that Nyungwe should be designated a National Park to ensure the protection of the remaining forest from the destruction now taking place as a result of uncontrolled clearing and timber exploitation. A program of reforestation is needed for hydrological reasons and to provide employment and income; a list of species (mostly exotics) is given, with indications of their potential for use in a reforestation program. A pilot scheme of taungya planting and controlled exploitation was begun in 1969 with Swiss technical assistance.
SOURCE: C.S./CAB. ABS.

Frankhart, R. P., and Sottiaux, G. 1972. Cartes des sols et de la végétation du Burundi, Volume I: Planchette Muramuya. Institut des Sciences Agronomiques du Burundi (ISABU). République du Burundi, Ministère de l'Agriculture et de l'Elevage.
Title in English: Soil and vegetation maps of Burundi: Vol. I.
Analysis of soil types and productivity in a 28,000 hectare area in the province of Muramuya for the purpose of studying their adequacy for the cultivation of tea. Provides a description of the geo-physical characteristics of the area (climate, geomorphology, hydrology, vegetation, land use,

soils). Three maps relate to the pedology, productivity and potential productivity of the area.

Frankhart, R. P.; Neel, H.; and Sottiaux, G. 1974. Humic mountain soils in Rwanda and Burundi: Evolution under human influence. Pedologie 24(2): 164-77.
Under natural forest or grassland conditions, these soils have a weak-structured, highly humic surface horizon, and low base saturation of the B and C horizons. The infertility of these humic ferrilsols is improved by traditional agricultural management, to an extent depending on the input of organic matter; anthropic surface and subsurface horizons they develop.
SOURCE: C.S./CAB. ABS.

Gatera, F. 1980. Accroissement démographique et déforestation au Rwanda. Bulletin Agricole du Rwanda (13):28-30.
Title in English: "Demographic growth and deforestation in Rwanda."
Historical review of relationships between demographic migration and deforestation in Rwanda. Two measures are suggested to impede further encroachment on natural forests: 1) encourage migration to valleys, which would require a substantial investment; and 2) enhancing the productivity of land already cultivated by introducing more intensive agricultural techniques.

Jacob, F. 1974. An evaluation study on the preschool health program in Rwanda. Catholic Relief Services Doc. No. 121. Field Bulletin No. 25. Nairobi: Catholic Relief Services.
This study evaluates a health program undertaken in 1966 to relieve malnutrition among children. Marasmal Kwashiorkor is the main form of malnutrition among children in Rwanda, involving secondary anemia, iron deficiency and intestinal parasites.

The program sought to provide (1) adequate education in child care; (2) regular surveillance of the child's nutritional/growth progress; and (3) supplementary foods. The project has succeeded in improving the nutritional standards of children in malnutrition-affected communities.

Lewalle, J. 1972. The vegetation belts of West Burundi. Bulletin du Jardin Botanique National de Belgique 42(1/2):1-247.
The soils, climate, phytogeography and flora of Western Burundi are described. Observations made during 6 botanical excursions are reported. Most forests are rapidly disappearing as a result of burning and cultivation. Four vegetation belts were recognized: a lower belt (Imbo) at about 780-1000 m alt.; a transitional belt (Mumigwa) at about 1000-1600 m, which was very degraded; a mountain belt (Bufundu-Mugamba and Bututsi) at about 1600-2400 m alt. and an Afro-subalpine belt at above 2400 m alt. Most areas include degraded savannas and steppes which are often overgrazed. The improvement of the savannas of the Rusizi Plain which is used for grazing is dependent on the establishment of valuable grasses and legumes such as Brachiaria ruziziensis and Stylosanthes spp. The protection of interesting plant formations is advocated.
SOURCE: C.S./CAB. ABS.

Luhelenge, M.; et al. 1979. Enquête sur l'onchocercose au Burundi. Annales de la Société Belge de Médecine Tropicale 59(3):251-58.
Title in English: "Onchocerciasis survey in Burundi."
A survey for onchocerciasis was made in 7 villages in the Bururi and Bubanza provinces in the west of Burundi. 247 persons were examined. The prevalence of infection ranged from 18.5% to 71.9%. The infections were light, usually less than 10 microfilariae per scarification, and the prevalence did not increase with age. Infection was slightly higher in Bururi than in Bubanza. The clinical symptoms were mild and no ocular troubles were observed. Simulium damnosum was found breeding in several rivers. A few people were infected with Dipetalonema perstans.
SOURCE: C.S./CAB. ABS.

Mahy, G. 1979. Contribution à la connaissance de la faune piscicole du Rwanda avec cles d'identification des espèces; II. Espèces nouvellement répertoriers dans les lacs de l'Akagera. Etudes Rwandaises 12(2):97-119.
Title in English: "Contribution to the knowledge of the fishery fauna of Rwanda and keys for the identification of the species; II. Species newly reported in the Akagera lakes."
This article presents the results of Professor Mahy's biological study of the fishery of Lake Mihindi in Rwanda. It contains detailed description of fish species discovered and reported for the first time. These findings made necessary the revision of the identification keys and thus all the known species (a total of 25) are presented, divided into 10 families.

Mutungirehe, I. 1981. Role de la forêt Rwandaise dans l'effort de protection et conservation des sols. Bulletin Agricole du Rwanda 14:28-32.
Title in English: "The role of the forest in the effort for soil protection and conservation in Rwanda."
The principal cause of erosion is the exposure of soils to rain. Regions especially threatened by severe erosion are Kibuye and Gikongoro. Natural forests offer effective protection against soil erosion. Less efective protection is provided by artificial forests. Specific recommendations for reforestation - to improve protection against soil erosion - are offered.

Nzindukiyimana, A., and Sabasajya, I. 1977. Lutte anti-érosive à Gikongoro: Le boisement de la colline Mujyejuru. Bulletin Agricole du Rwanda 10(1):36-38.
Title in English: "Erosion control in Gikongoro: Reforestation of the Mujyejuru Hill."
Reforestation of the hills (in Rwanda) to control erosion involves planting black wattle (Acacia decurrens) at high altitudes, Eucalyptus at intermediate altitudes, and cypress (Cupressus) on the lower slopes.
SOURCE: C.S./CAB. ABS.

Pouilloux, C. 1976. Problèms forestiers au Burundi. Bois et Forêts des Tropiques 170:21-34.

Title in English: "Forestry problems in Burundi."
The physical geography of Burundi is reviewed. Deforestation in Burundi is severe, leading to soil erosion and a shortage of forest products. Attempts at reforestation have been made with a wide range of species, particularly Eucalyptus. Recommendations are made for renewed efforts to increase the planting of exotic species and to protect the remaining natural stands (especially those of scientific interest).
SOURCE: C.S./CAB. ABS.

Raybould, J.N., and White, G.B. 1979. The distribution, bionomics and control of onchocerciasis vectors, (Diptera: Simuliidae) in eastern Africa and the Yemen. Tropen-Medizin und Parasitologie 30(4):505-47.
After a first section on the onchocerciasis vectors belonging to the Simulium neavei group and the S. damnosum complex, and on their bionomics and ecology, the bulk of this article is devoted to descriptions of the vector situation in individual countries. These countries are: Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Burundi, Somalia, Sudan, Tanzania, Uganda, Yemen, Zaire and Zambia. A table lists onchocerciasis foci (illustrated by a map) and reported vectors in eastern Africa.
SOURCE: C.S./CAB. ABS.

République du Burundi. Ministere de l'Agriculture et de l'Elevage. 1978. National plan of action for the fight against desertification: Pilot Study.
This report emerged out of the UNEP 1977 Nairobi conference. Desertification in Burundi results mainly from the pressures of a growing population on natural resources (eg. growing fuel need and consequent deforestation). The document (1) introduces and analyzes the existing situation in Burundi as well as the policies and programs implemented or proposed to cope with the desertification phenomenon; (2) suggests a plan of action to guide the adaptation of rural peasants to increasing resource pressures and thus reduce the pace and consequences of desertification.

Sorg, J.P. 1978. La forêt naturelle de Nyungwe (Rwanda): Exploitation ou protection? Schweizerische Zeitschrift für Forstwesen 129(6):445-52.
Title in English: "The natural forest of Nyungwe, Rwanda: Exploitation or protection?"
A review covering the geography, vegetation types, logging, and value for water, soil and nature conservation of this 100,000 ha tropical montane rain forest S. of Lake Kivu at 1860-2500 m alt. The main problems are the control of logging, mining and agricultural settlements which threaten to eliminate the forest within 100 years. A pilot forestry project based at Kibuye has established plantations of fast-growing and indigenous species on the forest margin, and is working for more effective political protection of the forest.
SOURCE: C.S./CAB. ABS.

United Nations Conference on Trade and Development/GATT. International Trade Center. 1976. Pyrethrum, a natural Insecticide with growth potential. Geneva, Switzerland: UNCTAD.

In 1975, approximately 23,000 tons of pyrethrum was produced. Although production levels are variable due to weather and other factors, output has been growing at an average of 6.7% over the past 20 years. The value of the exports has increased even more, notwithstanding the increasing production of synthetics. The total value of natural pyrethrum exported in 1974 was over $20 million, mostly in the form of extracts (80%), but also dried flowers or powder (17%), and marc (3%). Extraction and refining is increasingly situated in the producing countries. Kenya, Tanzania and Rwanda account for about 90% of production but 13 other countries are also current producers. Best yields are from cultivation at high altitudes in tropical zones, and production is therefore of interest to several developing countries; a number of them are either planning to increase or commence production. Markets are widely distributed; East African countries alone exported to more than 70 countries in 1974. Industrialized countries as a whole imported 78% of total world exports in 1974, the USA, UK, Italy, Australia and Japan accounting for three-quarters of this. Industrialized countries import mainly extracts for subsequent production of aerosols, whereas developing countries import chiefly flowers and powder for the manufacture of mosquito coils. Prospects for increased household use appear optimistic and are particularly favorable in developing countries if additional restrictions on the use of certain persistent, man-made insecticides are introduced as seems likely. Such an opportunity must be exploited to the full through active promotion and marketing measures that emphasize the non-toxic, non-persistent characteristics of pyrethrum.
SOURCE: C.S./CAB. ABS.

SMALL SCALE INDUSTRIES

Bart, F. 1979. La 'papeterie' de Zaza: Un exemple d'industrie implantée en milieu rural au Rwanda. Les Cahiers d'Outre Mer 32(128):401-12.
Title in English: "The paper factory of Zaza: An example of industry implanted in a rural environment in Rwanda."
Manufacturing industry was virtually non-existent in Rwanda at the time of its independence. Even though some progress has been made since, industry is confined to small scale, agriculture-oriented factories in the area of the capital. The installation of a new paper factory near Zaza, a small town in the rural and relatively undeveloped east of the country is thus of significant importance. The factory, created by private interest with governmental support, uses papyrus that is abundant in the marshlands of the area as a raw material and is labor-intensive, employing workers of the region. It represents thus an example of an industry well integrated in the environment and consistent to the level of development of the country. Despite some problems the prospects of further development are considered good.

Hafner, O. 1975. Coopérative de consommation et milieux Africains. Résumé de la thèse d'Outhmar Hafner soutenue en 1974 à l'Institut Catholique de

Paris et intitulée: Commercialisation et développement: L'entreprise coopérative Trafipro au Rwanda. Archives Internationales de Sociologie de la Coopération et du Développement 37:79-113.
Title in English: A consumer co-operative in the African environment. Summary of a thesis presented to the Institut Catholique in Paris in 1974 entitled "Marketing and development: The Trafipro co-operative in Rwanda".
Founded in 1958, Trafipro claims more than 50,000 members, (between 5% and 10% of all the families in Rwanda). In its 26 branches are found items of everyday use (textiles, food, etc.), the volume of which accounts for some 15% of the total volume of these items sold in Rwanda. Also found are agricultural inputs and tools, although on a smaller scale as these items are often distributed by agricultural development agencies. In addition, Trafipro collects, at 29 buying points, about 40% of the coffee produced in Rwanda. The enterprise has about 400 employees.
SOURCE: C.S./CAB. ABS.

Reintsma, M. 1982. The private sector in Rwanda. Paper prepared for USAID Kigali: USAID Rwanda.
A review of constraints on the development of the private sector in Rwanda.

Although government intervention is often positive and sources of capital sufficient, the lack of managerial/entrepeneurial training results in insufficient use of resources. Rwanda's relatively small population and low personal income limits local demand for industrial goods. Enhanced cooperative trade agreements with neighboring states are a possible remedy.

The author proposes four areas for national government and USAID/foreign aid assistance to the Rwandan private sector: 1. survey the private sector to more accurately assess constraints; 2. market studies to provide information on existing and potential markets for goods whose production is economically viable in Rwanda; 3. upgrading of management/entrepeneurial skills in addition to productive/service skills (auto mechanics, carpentry, etc.); 4. design and establish an advisory service with specialists in the area of marketing, accounting, bookkeeping, and business management.

United Nations Industrial Development Organization. 1977. Industrialization of the Least Developed Countries. Report of the Intergovernmental Expert Group Meeting. Vienna, 15-24 November, 1976. New York, USA: UNIDO.
One of the topics discussed at the meeting was the establishment of rural industrial projects. It was felt that the links between the small-scale sector and the rural economy needed to be strengthened and that it would be advisable to set up intensive projects in rural areas based on two important factors, namely: a) local resources, both human and material; and b) local needs, with the object of converting the present purely agricultural communities into agro-industrial communities and of attaining an even spread of industries throughout the countryside with a significant stress on non-farm opportunities. It might be best to locate these projects where a considerable effort in agriculture was being organized and where power was available, or in areas where large industrial units were being set up. It would be important to ensure that credit, technical and management assistance, factory sheds and training be available for this extension program. Country papers are presented for: Afghanistan, Bangladesh, Benin, Burundi, Chad,

Ethiopia, Nepal, Niger, Somoa, Somalia, Sudan, United Republic of Tanzania, and Upper Volta.
SOURCE: C.S./CAB. ABS.

EDUCATION AND TRAINING PROJECTS

Bendokat, R. 1977. Der Beitrag der Bildungspolitik zur landlichen Entwicklung. Schriften zu Regional-und Verkehrsproblemen in Industrie-und Entwicklungländern No. 23.
Title in English: "The contribution of educational policy to regional development: Illustrated by the example of Rwanda."
Educational reform and policy are of particular importance in agrarian countries with very low per capita income. (1) They must examine how far education and training are a necessary condition to achieve the required increase in food production and general economic growth. (2) They are faced with the task of 'ruralizing' education in rural areas so as to impart skills which enable people to improve their incomes and living standards. (3) The problem of vocational training has to be solved both within the general school system and the principles of the development policy. Training has to be coordinated with employment possibilities. The study begins from these problems of principles of the economics of education and development policy and goes on to empirical examination of the many aspects of rural education in Rwanda, one of the least developed countries. The chapters are: (1) Setting the problem and methodology; (2) Function of rural education in education and development policy; (3) Starting point of Rwanda development policy; (4) Description and evaluation of rural education institutions in Rwanda; (5) Evaluation of the function of rural educational institutions for educational and development policy.
SOURCE: C.S./CAB. ABS.

Dupriez, H. 1979. Integrated rural development projects carried out in Black Africa with EDF/AID. Evaluation and outlook for the future. Collection Studies, Development Series, EEC. No. 1.
Ten integrated rural development programs implemented with the help of the European Development Fund are assessed. Part I of this study describes the individual programs and reviews their results. Papers 2 to 6 bring out the salient points which emerge from the analyses. The problems of family farming in the traditional African environment are studied. The farms concerned were small units characterized by low factor productivity, minimal integration into the pattern of trade, but with a high degree of integration into the pattern of sociological, cultural and technical tradition in the rural societies concerned. None of the projects involved large agro-industrial complexes. The importance of getting to know the rural partners in their day-to-day lives is stressed. Economic policies and strategies must take rural priorities into account. Uncertainty about conditions of economic and social progress very often hinders peasant backing for the project goals put up by those in charge of projects. The latter are often likely to attribute to "peasant morality", the difficulties encountered when

implementing projects, rather than taking full account of the weight of constraints and limiting factors which influence work and change among rural people.
SOURCE: C.S./CAB. ABS.

Gabathuler, E. and Zutter, J.P. 1979. Le system de vulgarisation CFSME/AE. Bulletin Agricole du Rwanda 12(4):188-99.
Title in English: "The CFSME/AE extension system."
Part one of this article (Gabathuler) describes a new extension method devised by the staff of the Projet Agricole de Kibuye, based on coordination of training, simulation, methods and evaluation so as to improve income for the crop or livestock producer (CFSME/AE). The same method could be applied in health, nutrition or crafts, or for integrated projects. Ways in which the Commission de Vulgarisation (CV) operates at local level, and the media used to transfer ideas are discussed. The system was conceived and tested over several years in the Kibuye Project, and a specialized service has been set up to prepare materials and train staff. Part two (Zutter) describes how an agricultural competition is organized by the extension service, with prizes for individual, or groups of, farmers who have made improvements within the framework of the competition. The operation of the competition in the Bubazi rural development area (ZDR) is described in detail.
SOURCE: C.S./CAB. ABS.

Kagisye, S. 1977. Les actions en faveur des femmes et des jeunes. Agecop-Liaison 39:16-18, 21.
Title in English: "Encouragement for women and young people."
Although women and young people perform most of the work on Burundi family farms they have no influence on the way the household spends its money and play little part in co-operatives. With the participation of women, co-operatives would concentrate more on social affairs such as health and education. Children should also be given a chance to participate in co- operatives since this will train them to be effective leaders when they are old enough.
SOURCE: C.S./CAB. ABS.

Newbury, M.C. 1980. Ubureetwa and thangata, catalysts to peasant political consciousness in Rwanda and Malawi. Canadian Journal of African Studies 14(1):97-111.
The role of ubureetwa (one of several administrative tools collectively thought of as "clientship") in the creation of collective political consciousness among peasants in Rwanda is examined. Ubureetwa relates directly to land and labor, rather than working through a capital item such as cattle (ubuhake). The paper draws on comparative material from Malawi, where the history of an institution called thangata exhibits certain similarities to that of ubureetwa.
SOURCE: C.S./CAB. ABS.

Richter, L. 1976. Integrierte landliche Entwicklung in der Praxis. Zeitschrift für Ausländische Landwirtschaft 15(4):414-37.

Title in English: "Integrated rural development in practice."
Integrated rural development policies and programs are being worked out in a growing number of developing countries. However, severe difficulties have in many cases arisen in their implementation. This paper analyzes the experience gained in carrying out integrated rural development projects with international assistance in some ten developing countries. Among the major bottlenecks encountered, the lack of sufficient government commitment, as evidenced by the absence of a clear policy and the earmarking of adequate resources, as well as the lack of an adequate technical-administrative capacity to implement plans proved to be the most important ones. The shortage of competent and motivated manpower played a decisive role in the latter respect. Where such competence existed, more sustained and substantial progress was clearly visible. In order to overcome the bottlenecks or at least to attenuate them, the paper suggests the setting up of national integrated rural development centers, combining planning, action, research and training under "live" project conditions. While the main objective of these centers should be to develop preparatory and in-service training courses for the various manpower categories required by integrated rural development, another important task would be to forge a chain of information, analyses and publications on problems and requirements of integrated rural development. This is vital for creating a strong feedback link between policy making at the national level and action at the local level, and for bringing about full popular participation.
SOURCE: C.S./CAB. ABS.

Rushingabigwi, A. 1977. Le mouvement coopératif rwandais. Agecop-Liaison 39:13-15.
Title in English: "The co-operative movement in Rwanda."
This article begins by giving a brief general description of Rwanda and the history of its co-operative movement, which began in 1953. Great importance is accorded to training co-operative members and government grants are available for this purpose. The co-operatives are mainly self-financing, but government subsidies are available and a co-operative bank is planned. The chief difficulties encountered are as follows: administration is often slow, inefficient and dishonest; insufficient capital is available; some co-operatives are formed merely so that members have easier access to credit; in some co-operatives members fail to pay their bills, which paralyses the normal flow of money.
SOURCE: C.S./CAB. ABS.

Sam, P.D. 1976. Le groupe de travail en tant qu'unité de base de la formation au village. International Development Review Focus 2:17-20.
Title in English: "The group training unit: Key to village development."
Experience in Africa (Burundi and Upper Volta) has shown that a catalytic element in village development has been the Group Training Unit (GTU). Traditionally an agricultural extension agent has tried to work with 400 to 1200 farm families, but rarely is in direct contact with more than 40 to 50 per month. Under the GTU method small groups of about 20 to 25 farmers are organized and each group has as a key member a carefully chosen natural

leader. The extension agent works through the key member meeting with the group once a week. This method combines the American concept of group dynamics and the Chinese technique of an agricultural production unit.
SOURCE: C.S./CAB. ABS.

United Nations Development Programme. 1980. Rural women's participation in development. New York, USA: UNDP (Source: Third World Quarterly 3(1): 170-71).
Prepared over eighteen months in collaboration with a wide range of UN organizations, the UNDP study is based on both 'desk reviews' and missions carried out in Rwanda, the Syrian Arab Republic, Indonesia and Haiti. Its aim is to improve the UN's capabilities to advise governments on programming to meet women's needs. This is based on the view that the governments of developing nations have reached the point where they are willing to undertake projects concerned with the specific needs of rural women. There are, however, significant obstacles remaining: 'lack of experience and competence, bureaucratic inertia, persistent attitudinal barriers, and the need to reallocate resources."
SOURCE: C.S./CAB. ABS.