Burundi Health Sector Assessment and Strategy

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BURUNDI HEALTH SECTOR

ASSESSMENT AND STRATEGY

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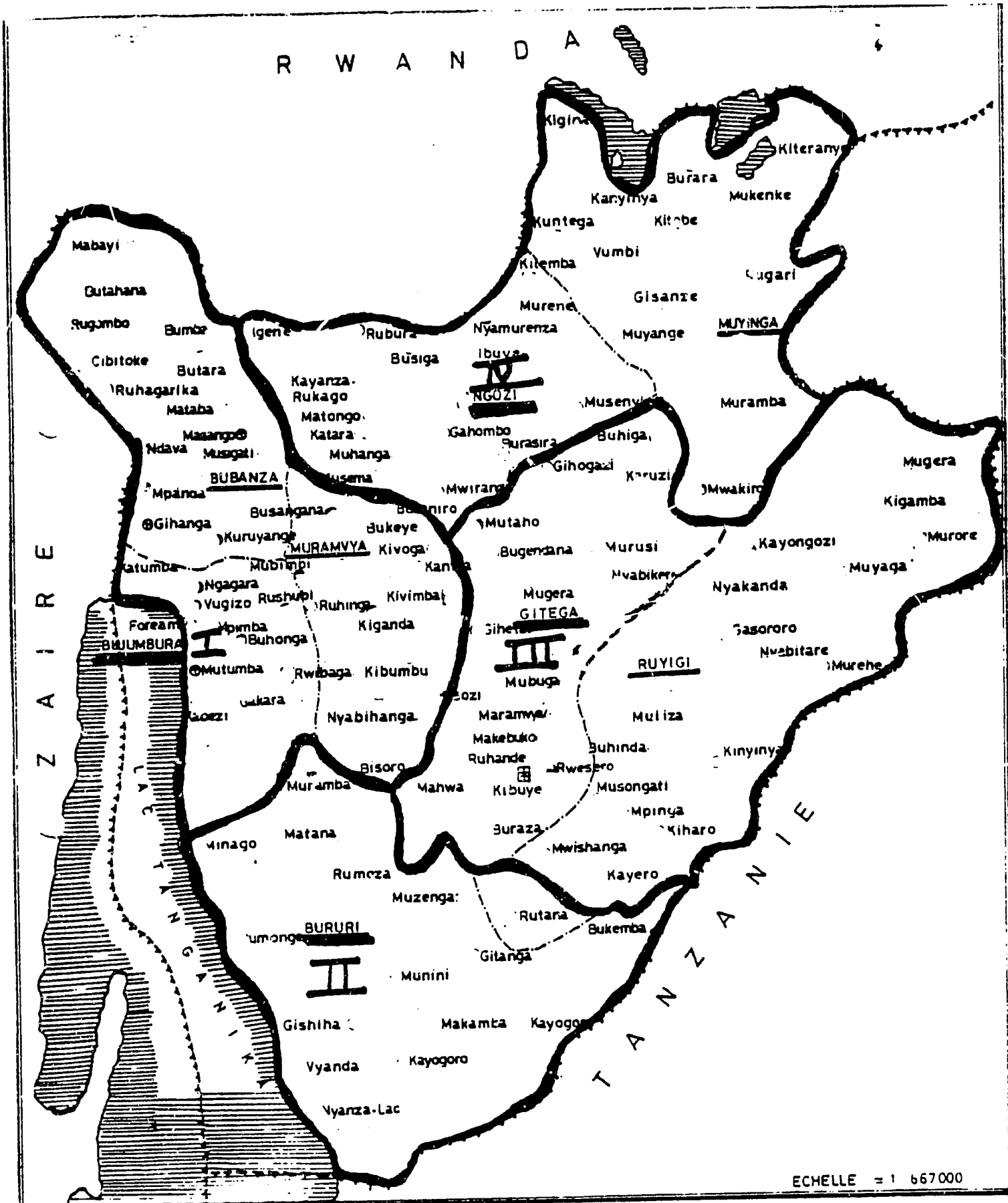

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REPUBLIQUE DU BURUNDI

REGIONS MEDICALES: BUJUMBURA, BURURI, GITEGA, NGOZI.

PROVINCES BUBANZA, BUJUMBURA, BURURI, GITEGA.
MURAMVYA, MUYINGA, NGOZI, RUYIGI.

Preface

This Health Sector Assessment was considered as a Reconnaissance/ Evaluation with two main purposes: to assemble in one document most of the relevant information available about the health sector, and tc evaluate the information gathered and suggest a strategy for AID's orderly development assistance in this sector.

Since the study has multiple purposes and is quite long,readers, depending on their needs and interest, may wish to approach the report in different ways. Those who need an overview for operation and program decision making will find that chapter VII (of 17 pages) will provide this. Others can readily identify special areas of interest from the rather detailed list of contents.

The findings in the report are based on a wide range of documents reviewed, interviews from many people in diverse fields and interest and a reasonable amount of field site visits both in Bujumbura and in the interior. Conclusions reached were based on the sum total of these sources and many are necessarily based on informed value judgements. Inevitably other observers will disagree with some of the observations and conclusions. However, the evaluation team is confident that the picture of the health sector presented is, on the whole, essentially accurate - and reflects an honest and thorough appraisal of the health sector situation as of early 1981.

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I. Setting Relevant to Health Status

A. Geographic Characteristics and Health

1. Physiography and Climate

Burundi occupies a land-locked position in Central Africa located just north of the equator between latitudes 2½ and 2½ south and between longitudes 29° and 31° east. According to the provisional results of the 1979 census, Burundi has a population of 4,021,910 living on 26,109 square kilometers or a density of 154 persons per square kilometer.

The most predominant physiographic features located within these parameters is the western extension of the Great Rift Valley of Africa and the resultant fault block mountains rising to the east of the Rift.

The Rift and its related eastern block mountains contain four broadly defined physiographic regions. These regions could be more finely divided to highlight outstanding features but are adequate for the purposes of this report. The four regions are:

- The Ruzizi River - Lake Tanganyka Plains
- The Zaire-Nile Creat
- The Central Plateau
- The Eastern Region

a. The Ruzizi River - Lake Tanganyka Plains

The Ruzizi River - Lake Tanganyka Plains occupy the Rift Valley. The plains are broader to the north in the Ruzizi River and more restricted along the eastern shore of the lake. These plains are tropical in nature with an average elevation of 800 meters and

average annual temperatures between 22.5° - 25° C. Annual precipitation ranges from 800 to 1000 mm. Above these plain areas are a series of steeply sloping foothills making up the western slopes of the Zaire-Nile Crest with temperatures ameliorated by the elevation and an increase in the annual precipitation.

b. The Zaire-Nile Crest

The Zaire-Nile Crest is the uplifted portion of the rift composed of deeply eroded linear ridges making up the watershed divide of the Zaire and Nile River systems. The elevation of these ridges vary from 2,000 to 2,600 m and extend in a north-south direction along the eastern edge of the Rift.

Annual precipitation ranges from 1300 - 1600 mm with the higher amount in the northern end of the crest along the Rwanda border and in general increasing from west to east ascending from the rift to the crest. Annual temperature will vary from 17° - 19°C depending on elevation and frost is not unknown at the highest elevations during the June - September dry season. Also of interest is the significant variations in daily temperatures.

c. The Central Plateau

The Central Plateau, extending eastward from the Zaire-Nile Crest, is underlain by a schist formation with basaltic intrusions and an area of metamorphosed schist and granite schist.

The schist formation underlies an area that was eroded almost to a plain (peneplaned) giving rise to linear ridges and metamorphosed rocks forming rolling domed-shaped hills with the tops

of both type hills exhibiting outcrops of the base rocks limiting farming to the valley and steep slopes. Elevations range from 1,500 - 1,900 m.

Annual precipitation ranges from 1,000 - 1,200 mm and increases with elevation. Temperatures also vary with elevation and range from an average of 19° - 20°C.

Sloping northward from the Central Plateau towards the Rwanda border is a swampy lowland area dominated by Lake Cohoha and Rweru.

d. The Eastern Region

The Eastern region is an extension of the Central Plateau with a series of crystalline ridges and valleys aligned in a general southwest-northeast direction. Elevations in the area of 1,300 m are observed in the higher areas and grade to the lower savanna and plain areas along the Tanzanian border to the east and southeast. The border area in the Mosso or Kumoso is a region of hot swampy lands.

The drier areas in the linear aligned valleys have annual rainfall of 900 mm while the border areas to the southeast receive 1,200 mm of rainfall. Temperatures for the year range from 20° - 23°C depending on elevation.

e. Climate

The climate of Burundi is tropical but modified by elevation especially where temperature is concerned. True hot tropical climate is found in the plains of the Rift and in the low-lying sometimes

swampy areas of the eastern region bordering Tanzania. These lower areas have tendencies of malaria infestation along with schistosomiasis, scrub-typhus and in the past trypanosomiasis.

The Zaire-Nile Crest and the Central Plateau areas enjoy the most pleasant climate to be found in the country. Tempered by elevation, these upland areas beyond the 1,500 m zone are free from the debilitating effects of the endemic diseases suffered by the people of the lowland areas. It is not surprising then that some 65% of the population is located in these cool, well watered upland areas.

The pattern of rainfall reveals a long rainy season from October through April with a "statistical" dry season, or more accurately a less rainy season, during January and February. This dip in the main rainfall pattern reflects the hiatus period of the rain bringing inter-tropical front in its twice annual passage through the country. A definite dry season does occur during June, July and August while May and September reflect transition months between the wet and dry seasons.

The lowest annual rainfall amounts, 800- 1000 mm, are found in the Rift Valley area and the linear valleys of the Eastern region; while the highest rainfall is concentrated in the northwestern areas bordering Rwanda where annually 1600 mm is not uncommon. The Central Plateau is transitional to these low and high rainfall areas, recording annual rainfall in the 1000 - 1200 mm range.

While rainfall throughout the country is predictable to season of occurrence, there is a tendency for variations in amounts

of seasonal rainfall with reduced rainfall years creating drought conditions and resulting in reduced agricultural output for both commercial and subsistence crops.

2. Natural Resources

The natural resource most abundant and clearly visible is the land. The land blessed with abundant rainfall, a fairly rich laterite soil coupled with a temperature elevation allows for the production of two crops per year and in some limited areas as much as three crops.

The soil characteristics are such that the steep Burundian hillside can be cultivated whereas they would not be cultivable in other areas of Africa. As noted in the section on physiography, rock outcrops on many hillsides restrict agriculture to the steep slopes and valley floor. Some valley floors, especially in the Ruzizi, contain black alluvial soil, while some of the highland valleys contain peat or peat soil and are often times poorly drained.

Offsetting this natural resource is an actual reduction of arable land caused by over-farming, severe erosion resulting from traditional farming methods, cutting down the forest cover and lack of proper erosion control measures and terracing. Adding additional land to cultivation is not considered feasable since it is estimated that of 1.4 million hectares of arable land available only 150,000 hectares are not cultivated and are suitable for cultivation.

In the field of mineral resources, the country has not been

uniquely blessed although a recent discovery of nickel in the southeastern part of the country may prove to be commercially feasible. Preliminary estimates indicate reserves of 5,000,000 tons, some 5% of the world reserve.

Peat deposits may present an alternative to present use of charcoal which has helped to denude previously forest-covered lands. Peat deposits are presently being worked in the general area of the Zaire-Nile Crest southeast of Bujumbura, while the most extensive deposits in the Ngozi area (Nyacijima) remain unexploited. AAO/Burundi is assisting the Government of Burundi to improve the infrastructure of the National Peat Board. Annual production is estimated at 10,000 tons with an increase to 15,000 tons possible in 1981.

Large deposits of peat are also located in the Grand Marais area along the Rwanda Border. Possible assistance for developing these reserves may come from the E.E.C.

While many minerals have been identified, few are in sufficient quantities to make their mining commercially feasible. These include some gold, cassiterite (a tin ore), kaolin, limestone, bastnaesite and columbium.

The country is endowed with an abundance of water from its high annual yields of rainfall. The main watersheds are the Zaire and Nile River systems. The rivers draining into the Ruzizi and Lake Tanganyka and thence into the Zaire system are steep slowing and shallow with white-water sections created by falls and rapids.

Hydro-power stations are possible along these streams and one is being built to the east of Bujumbura along the Mugera River, which will provide the city's power needs.

Four fifth of the country is drained by the Nile system which has several large rivers such as the Ruvyironza and the Ruvubu and a myriad and complex system of inter-connecting rivers and rivulets. Some hydrosites have been selected in this region, one of which will provide Gitega with its power needs.

Swampy lands along the Tanzanian border are eventually drained into the Muragarazi River which flows to Tanzania and eventually into Lake Tanganyka or the Rumpungu which joins the Kagera and eventually into Lake Victoria.

Besides Lake Tanganyka, several other notable lakes and their adjacent swamp areas are located in the country. These lakes are Rweru and Cohoha.

Another aspect of water sometimes overlooked is the more than 4,000 fresh water springs located throughout the 2,400 collines in the country which provide much of the water for most of the population. The dispersal of these springs becomes a kind of safety valve during times of epidemics such as cholera where limited sources of water can greatly increase the number of victims. These springs are presently being capped and refurbished under a project administered by UNICEF.

3. Communications and Transport

a. External

Burundi's land locked position in east central Africa puts

it in a disadvantageous position vis-a-vis imports and exports. Its nearest ocean port, Dar-es-Salaam, is located on the Indian Ocean some 1,400 km away, reachable by lake steamer to Kigoma in Tanzania and then by rail to the port. An alternate port on the Indian Ocean is Mombassa, 2,000 km away. This access is reached by transiting Rwanda and Uganda by road and by rail through the breadth of Kenya. Some traffic make the journey Bujumbura - Mombassa entirely by truck.

These routes are hampered by border crossing formalities, a deteriorating road and rail system, antiquated port facilities in Kigoma, Dar-es-Salaam and Mombassa as well as a back log of ships loading and unloading at the latter ports. As Burundi's imports and exports expand, a further strain will be exerted on these already overstrained systems. A repetition of past civil disturbances or political problems among and between the transiting countries would cause additional and costly burdens.

Air freighting, as a viable alternative, can be considered only for low bulk-high value items or for emergency created situations.

b. Internal

The internal road network within Burundi is quite adequate for present needs but needed improvements are either planned or underway. The main paved roads are Bujumbura southward to Rumonge and eastward from Bujumbura to Gitega with a spur of this road leading from Muramvya northward to the Rwanda border. Under construction is a road northward along the Rift from Bujumbura to Cibitoke

to the frontier. There are 545 km of paved and soon to be paved roads.

A dense network of laterite earthen roads and tracks radiate outward from these centers connecting and interconnecting additional population centers. Most can be negotiated by trucks or four-wheeled drive vehicles while the least passable are the so-called communal tracks. During the rainy season access to many of these roads is restricted. It is estimated that there are 4,500 km of these roads and tracks throughout the country. Hand labor is used to maintain most of these access routes while external assistance is providing roadbuilding equipment for grading and clearing major land slide.

A major system of footpaths connect most of the collines with their patterns of isolated "rugo" homesteads.

B. Demographic Characteristics versus Health Development

1. Population Size, Growth and Distribution

The first general census of the population of Burundi was taken between August 16 and August 30, 1979. This was preceeded by a pilot census held in August 1978 to test methodologies and census techniques.

More than 5,000 people, including census enumerators and officials of the provinces, communes and districts participated in the count. The results were hand tabulated and presented in a printed publication, "Preliminary Results of the 1979 Census", published by the Central Bureau of the Census, Ministry of Interior.

The data includes population by sex, province, commune and by "census" collines.

The Census Bureau cautions that the "Preliminary Results" should be considered an independent data source that cannot be compared to past administrative and civil censuses and demographic surveys. This is due to the different methodologies involved, partial or limited recording of data by the administrative and civil censuses, sampling sizes and errors and the ultimate use of the collected data.

A Post-Census survey was conducted between November 5 and 20, 1979 to evaluate the methodologies of the census and the survey, to verify census results and to gather data on population characteristics such as births, deaths, marital status and fertility. Data was also gathered for characteristics of habitat by house and "rugo". The results of this effort was presented in mimeo form under "Incomplete Raw Data of the Post-Census Survey, 1979" published by the Department of Population, Ministry of Interior.

a. Summary of 1979 Census

The Republic of Burundi contains 26,109 square kilometers of national territory (excluding Lake Tanganyka) and a population of 4,021,910 giving a density of 154 people per square kilometer.

The population is composed of 1,944,620 males (48.4%) and 2,077,290 females (51.6%). The 3.2% difference between male and female population results in 94 males for 100 females. For Bujumbura

City the male-female ratio is quite different in that there are 11.4% more males than females resulting in a situation where there are 126 males for 100 females. The population of Bujumbura is 141,040. (See Annex 1 which shows population by sex, province and density.)

The country is divided into the following administrative units:

1. 8 Provinces
2. 18 Arrondissements
3. 79 Communes
4. 2,460 Collines

The collines contain 626,480 rugos having 856,860 households. The average number of households per rugo is 1.4. The average number of people per rugo is 6.4 while the average number of people per household is 4.7.

For Bujumbura the census revealed 11,590 "parcelles", (urban equivalent of rugos) having 28,020 households with an average of 11.6 people per "Parcelle" and 5 people per household. (See Annex 5 .)

As noted in Annex 1 , the average density of the country is 154 people per square kilometer. There are however four provinces with densities higher than the national average. These are Bujumbura, Ngozi, Muramvya and Gitega. The FY 1983 CDSS for AAO/Burundi, using growth rate data from sources not available to the DIMPEX Team, projected population growth in 1987 for individual provinces using a separate growth rate for each province. These data are

included in the following table:

BURUNDI

SELECTED POPULATION DENSITIES

1979 & 1987

PROVINCE	1979 POPULATION	1979 DENSITY	*GROWTH RATE %	1987 POPULATION	1987 DENSITY PERSONS/SQ. KM
BUJUMBURA (Without City)	319,270	251	3.8	430,266	339
NGOZI	773,330	286	1.0	837,405	309
MURAMVYA	380,320	246	0	380,320	246
GITEGA	682,990	198	1.3	757,358	220
BUJUMBURA CITY	141,040	-	5.0	208,380	-

*BASED ON UNPUBLISHED DATA/SOURCE)

The 1979 population of these four provinces plus Bujumbura City represent 57% of the total population of Burundi.

The national density of 154 people per square kilometer is the second highest in Africa and yet the above table shows provincial densities well above the national average. It is no surprise then, that within these provinces are communes with as much as double the national average. The following is a list of communes having more than 300 persons per square kilometer:

BURUNDI

SELECTED COMMUNE DENSITIES

1979

PROVINCE	COMMUNE	DENSITY PER SQ. KM.
1. BUJUMBURA	A. ISALE-MUGARURO	357
	B. KABEZI	427
	C. KANYOSHA	607
2. GITEGA	A. GIHETA	327
3. MURAMVYA	A. MBUYE	307
	B. KAGANDA	324
4. NGOZI	A. RANGO	302
	B. GAHOMBO	311
	C. BANGA	329
	D. NGOZI	332
	E. KAYANZA	368
	F. BUSIGA	368
	G. GATARA	372
	H. MWUMBA	373

These 14 communes, together with another 21 communes having densities of more than 200 people per square kilometer, form an almost contiguous zone in the highland areas of Gitega, Muramvya, Muyinga and Ngozi provinces. These highland areas, together with Bujumbura City and province contain as much as two-thirds of the population of Burundi. These densly populated highland communes, individually or as a group, could serve as models for future studies on the effect of the man/land/food ratio.

The four provinces along the periphery and frontiers of the country display densities less than the national average ranging from a low of 69 in Ruyigi to 148 persons per square kilometer in

Muyinga. Within these provinces the lowest density is found in Nyanza-Lac commune in Bururi Province with 18 persons per square kilometer. Along the Tanzanian border in Ruyigi Province, commune densities range from 41 to 64 persons per square kilometer. These low-lying areas are less desirable for habitation being hotter, less well-watered and less salubrious than the central highland zone.

b. Summary of the Post-Census Survey

The post-census survey dealt with the collection of data on population characteristics and was collected by sex and age group for each province, Bujumbura City and Burundi with and without Bujumbura City. The extrapolated population figures were derived from a survey sample of 77,892 of which 12,925 was located in Bujumbura City.

The difference between the population of the census count and the survey is due in part to the overweighting of the urban versus rural component of the sample and the 3 months time interval between the census and sampling during which there was a growth in population. There were instances of non-comparable census units used for the census count and survey due to the inability to define accurate census boundaries. Additional errors could have resulted from the method of hand tabulating both results.

The Department of Population suggests that for all extrapolation done at the national level only the data for Burundi without Bujumbura City should be considered. Population by sex and age

groups are presented for Bujumbura City and Burundi with and without Bujumbura City and included as Annexes 3, 4 and 5. Population by sex and age groups are also included for each province (See Annexes 7 - 14).

A population pyramid for Burundi without Bujumbura City reveals a very broad base indicative of a high birth rate. In addition, there is a large component of women in the child bearing age groups of 15 to 44 (in absolute numbers more than 864,000) and a very small number of women leaving the child bearing age indicative of continued high fertility rates (See Annex 6).

The population pyramid for Bujumbura City has as its dominant feature a bulge in male component of the 15-55 age group confirming the preponderance of male migration to the city. The broad base and large number of women between 15 and 44 are also a feature of this pyramid (See Annex 6). The following table, the percent of population by large age group as determined by the Post-Census Survey, is illustrative of these population characteristics:

DISTRIBUTION OF POPULATION

BY LARGE AGE GROUP

AGE GROUP	BURUNDI WITHOUT BUJUMBURA CITY IN %		BUJUMBURA CITY IN %	
	CENSUS	SURVEY	CENSUS	SURVEY
0 - 14	42.89	42.85	37.72	38.93
15 - 54	48.39	48.53	58.26	57.00
54+	8.72	8.62	4.02	4.07
TOTAL	100.00	100.00	100.00	100.00

The study on nationality for Burundi reveals a population almost exclusively Burundian - more than 99% - with a small admixture of Rwandians, Zairoises and minor nationality groups.

When the study is limited to Bujumbura City quite a different pattern is revealed. The Burundian portion of population of Bujumbura is barely half (50.2%) with the balance 49.8% made up mostly of Rwandians and Zairoise. The following table illustrates this "interior" versus urban characteristics of the distribution of nationalities:

NATIONALITY

RESIDENT POPULATION

NATIONALITY	BURUNDI WITHOUT BUJUMBURA CITY IN %			BUJUMBURA CITY IN %		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
BURUNDIAN	47.95	51.09	99.04	28.88	21.24	50.12
RWANDIAN	.45	.36	.81	11.40	10.68	22.08
ZAIROISE	.02	.02	.04	10.24	9.38	19.62
OTHER	.05	.06	.11	4.34	3.84	8.18
TOTAL	48.47	51.53	100.00	54.86	45.14	100.00

The distribution of religions shows a distinct difference when the rural area is compared to Bujumbura City. The census survey does establish that the Catholic religion is dominant in the country but less so in Bujumbura City. Muslims represent 1% of the

population country-wide but 25% of Bujumbura City. Other religions distinguished are Protestant, traditional and minor grouping of Asiatic Buddhists and Hindus.

The following table illustrates the breakdown of religions by "interior" versus urban location:

RELIGIONS

RESIDENT POPULATION

RELIGION	BURUNDI (WITHOUT BUJUMBURA CITY) IN %	BUJUMBURA CITY IN %
CATHOLIC	74	65
TRADITIONAL	10	0.1
PROTESTANT	9	7
MUSLIM	1	25
OTHER	6	2.9
TOTAL	100	100.0

The following table gives the marital status of the population:

MARITAL STATUS

RESIDENT POPULATION

MARITAL STATUS	BURUNDI (WITHOUT BUJUMBURA CITY) IN %			BUJUMBURA CITY IN %		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
SINGLE	62.41	55.12	58.65	68.75	59.31	64.49
MARRIED	36.15	35.80	35.97	29.96	27.95	29.05
WIDOW	.72	6.81	3.86	0.38	7.31	3.51
DIVORCED	.72	2.27	1.52	0.91	5.43	2.95
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00

At a glance it can be seen that there are more men than women, 7% more in the rural area and 9% more in Bujumbura City. There is a tendency for the Bujumbura City male to marry quite later in life than his rural counterpart. This is explained in part by the differences in standards of living, education, living costs and social aspirations between the urban and rural dwellers.

Another striking difference is in the numbers of widows and divorcees among women as compared to men. The probable explanation of this is that male widowers and divorcees remarry more frequently thus reducing their number in these categories. Also the fact that men die younger than women increases the proportion of women widows.

The determination of an accurate rate of population growth has not been resolved either by the census or the post-census survey. Part of the problem arises from the fact that the 1979 census was the first census that could claim national coverage. In the past the administrative and civil censuses and demographic surveys obtained only partial coverage and margins of error were high due to the size, composition and distribution of the sample. Thus there is little or no possibility for comparable data with respect to the 1979 census and post-census surveys and previous census attempts.

The post-census survey has some shortcomings due in part to sampling errors previously discussed but also to the responses to questions on births and deaths. The 12-month recall period also created additional problems in obtaining valid data.

Two problem areas were in the undercounting of births and

deaths. According to the post-census survey the crude birth rate was 44 per thousand while the crude death rate was 7 per thousand (according to survey data, 504 deaths were reported out of the survey sample of 77,892 or a crude death rate of 6.5 per thousand). Past surveys showed a death rate of 20.4 urban (undefined) and 25.8 rural in 1965 and 20 in the 1970-71 survey. The death rate in the 1979 survey was undercounted for two reasons. First a reluctance on mothers to discuss deaths of infants which supposedly brings dishonor to the family. Second, a general reticence on the part of all family members to discuss deaths of adult members. Add to this the 12-month recall period and the margin for undercounting mounts.

The undercounting of births are due to the same reluctance and reticence on the part of families to discuss intimate details of birth and the year long period which taxed memories of mothers. The 1970-71 survey showed a birth rate of 44 per thousand the same shown by the under-counted 1979 survey.

Thus there is no accurate birth or death rate which can be attributed to the 1979 post-census surveys. However, unpublished studies by staff members of the Center for Demographic Research seem to indicate that the birth rate of 44 per thousand is about as accurate a figure that can be obtained.

An independent study by the Center indicates a definite trend towards the reduction of child mortality. Using a new statistical technique they show a reduction of infant mortality

from around 160 to 140 from 1965 to 1979 for Burundi as a whole and from 100 to 80 for Bujumbura City for the same period. The definite downward trend in infant mortality rate would appear to offset the high rural death rate of 25.8 in the 1965 survey. Taken with the rate of 20 in 1970-71 survey (distorted by a small sample size) the Center does not feel it unreasonable to suggest a death rate of 22 for the 1979 survey.

In either case - birth rate or death rate - the resultant figures are the best estimates that available data and statistical manipulation of these data can provide. Assuming a birth rate of 44 and a death rate of 22, the Center for Demographic Research is using 2.2 as the rate of population growth for Burundi.

As a result of the undercounting of births and deaths and the faulty response factor generated by the 12-month recall period, a request has been made to UNFPA to design a survey which will enable the Center to obtain statistically valid data on birth, death, fertility and internal migration. This survey will take place during the 10 year intra-census period and at that time a reliable growth rate can be determined.

2. Migration

Migration was a subject handled neither by the census nor the post-census survey. However, interpretation of some of these data can lead to some possible conclusions of internal migration. Except for some historical references, there is great difficulty in determining external migration.

Both the census and post-census survey indicate a high ratio of males to females in Bujumbura City when compared to Burundi without Bujumbura City. There are 126 men for 100 women in the city as compared to 94 men to 100 women in the country. There is no doubt that the high male to female ratio in the city, especially in the 15 - 45 age group, represents the exodus of youths and unemployed or underemployed men from the rural areas to the urban areas in hopes of greater employment possibilities.

The census shows a breakdown of 51.6% female versus 48.4% male for the country as a whole. The difference of 3.2% between female and male could be the result of more males dying than females or an undercount. However, there are some provinces where the female/male ratio is almost double the national average. The following provinces show higher female/male ratio than the national average of 3.2%.

	PROVINCES	% MALE	% FEMALE	DIFFERENCE
1.	Muyinga	46.9	53.1	6.2
2.	Gitega	47.3	52.7	5.4
3.	Ngozi	47.8	52.2	4.4
4.	Ruyigi	47.9	52.1	4.2

These differences are so substantially above the national average that they cannot be attributable to the normal death pattern or faulty counting. They represent a definite migration outward from these rural areas to the urban areas of Bujumbura which shows a population composed of 55.7% male versus 44.3% female. This difference of 11.4% male to female in Bujumbura compares to a 3.2%

superiority in females for the entire country.

The Ministry of Rural Development and UNFPA recently signed a project agreement concerning migration and population redistribution. The project has as objectives, surveys to determine the socio-economic reasons for migration and a systematic study of the composition and flow pattern of internal migration. This study should go a long way towards answering many of the outstanding problems of internal and, possibly, external migration.

3. Family Size and Housing

The census revealed that on the 2,460 collines of the rural areas there were 638,070 rugos having 884,880 households or an average of 1.4 households per rugo. The average number of people per rugo was 6.4 and 4.7 per household. There are 94 men per 100 women in the rural areas.

In Bujumbura City there are 11,590 "parcelles" with 28,020 households or an average of 11.6 people per "parcelle" and 5.00 per household. There are 126 men per 100 women.

The Post Census Study of November 1979 attempted to gather housing characteristics by rugo and by household by sampling methods. The information by rugo included source of water, toilet location, and occupant status. Data on households included shape and type of homes, building materials for walls, roof and flooring and method of home lighting.

The data is presented for Burundi, Burundi without Bujumbura City and for Bujumbura City and is included in Annexes 15, 16 and 17. Population differences exist in the census count

versus the sampling count due to the size and composition of the sample, three months time lapse between census and sampling, tabulating errors and non-comparable census enumeration units.

In general it can be said that most of the rural houses are of traditional type, square or rectangular in shape with straw roofing, mud or reed walls, earthen floors and use firewood as a lighting source.

The results for Bujumbura City show most of the housing to be modern, square or rectangular in shape, with eternit sheeting for roofs, stone or brick walls, cement flooring and oil or gas used in lighting. Most of the homes reported to be using electricity for lighting are in Bujumbura.

In the rural areas. the source of most water are capped or uncapped springs. Most toilets are found outdoors and practically everyone owns their own home.

The urban area of Bujumbura has about one-third of the houses with running water but 70% depend on sources outside the home. About one-fifth of the homes have indoor toilets but 82% are located outside the home. The city has about one-third rental versus two-thirds home owners. (See Annexes 18 and 19 for a summary of housing data on house and rugo characteristics for Bujumbura City and Burundi in percentage form.]

C. Educational Status of Population

Basically the educational status of the population is poor. USAID estimates that only 25% of the Burundi population 15 years of age and over can read in Kirundi. One study done in the Bubanze province suggested that fully 90% of the adult women in the region were illiterate.

As a result of educational reform begun in 1973 in collaboration with UNESCO, Kirundi is the medium of instruction in primary school. Education is a priority, 55% of the social/administrative budget is spent upon education.

Various sources indicate that 23 - 50% of the primary school age children attend government schools, only 10% of the primary school are girls are included.

Currently 90% of the primary school budget is expended on teacher salaries, leaving little for anything else. The government recognizes this problem, but it is not in a position financially to rectify it. One informed source stated that primary school teaching is no longer considered a status position and that it is being left to relatively untrained women.

A major objective of the government is to promote literacy in the local language and to gear primary education to the rural milieu, as only 3% of the relevant age group attend secondary school. The Five Year Plan states:

Section 4.6.2.2.: Objectives

"- to put on a sound footing a literacy program which will permit full literacy in Burundi towards 1990.

- to create the necessary number of places in the secondary school system to absorb a greater number of primary school graduates.

- to increase the capacity of the university from 1170 - 3000."

Section 4.2.2.3.: Measures

"- to increase the availability of places at the primary school level, the construction of 100 polyvalent centers is planned. This measure will increase by 100,000 places in primary education during the five year period."

Thirty of these centers have been completed. The World Bank provided 100,000,000 FBU for the construction of the 100 centers. The original plan did not account for inflation, increase in building costs, transport, etc. and the funds are depleted.

The plan continues:

Section 4.6.2.3.:

" the literacy program which will be realized due to action by the Party and the Ministry of National Education will include construction of literacy centers, acquisition of appropriate materials, and the organization of literacy courses for the centers, as well as within the existing primary and secondary school infrastructure."

Non-formal education is of increasing importance. The Department of Social Promotion, part of the Ministry of Social Affairs and Labor, is responsible for a literacy program, nutrition and agricultural training being conducted in the "foyers sociaux".

The missionary groups who have traditionally played an important role in the provision of educational services continue to do so in basic education. The "yagamukama" (Talk with the Lord) basic education centers teach reading, writing, some agriculture, health nutrition to an estimated 270,000 children. (45% of the primary school aged children and nearly 40,000 adults.)

There are two programs in the secondary school system, a six year Humanities program preparatory for those entering University or teacher training, and a 3 year technical or Humanities program from which students may enter technical training. About 3[illegible],000 students completed both types of secondary school in 1978.

The University of Burundi was established in 1963. It currently has nine faculties with an enrollment of 1,813 students. (Law 341, Economics and Administration 318, Humanities 364, Medicine 160 - the first group of fully trained Burundian doctors are expected to graduate in 1983 - General Science 368, Teacher Training 49, Agronomy 49, Psychology and Education 111, and Physical Education 29.)

D. Economic Status of Population

Burundi has an economy based largely on subsistence with small individual cash earnings mainly from the sale of coffee. With a per capita annual income of about $130 - $140, Burundi is usually classified as one of the poorest countries of the world. The World Bank, in 1975, found that 90 percent of the rural population was below the absolute poverty income level, which at that time was estimated at $80 per year. In the same year, the World Bank estimated that only 30 percent of urban dwellers were below this level; a more recent study indicates that this has increased to 55 percent.

Despite this grim picture drawn from per capita income figures, abject poverty as manifested by wide-spread malnutrition due to food shortages is not evident; rather the typical rural family lives very close to the minimum sustaining level. Subsistence food crops account for 75% - 80% of agricultural production, livestock products for 5% - 10%, forestry about 3% and fisheries less than 1%. Only about 8% - 10%, by value of total production, consists of cash export crops. The Burundi farm family typically consumes most of what it grows; cash earnings are small. The resultant pattern, since over 90% of the population are rural farmers, is a fairly homogeneous distribution of the little wealth available. The "typical" Burundian farmer is described in the USAID/Burundi CDSS, FY 1978 as follows:

> "The representative Burundi is a Hutu farmer with a bit over a hectare of land, often broken into fragments managed by himself and his immediate

family. He is illiterate; it is unlikely his sons go to school and even less likely for his daughters. There is an even chance he grows coffee and if so his farm family earns less than $400 annually. He pays no taxes. He owns four animals, none of them cattle. He grows three crops a year, survives on a diet of beans, cassava, maize, vegetables and occasionally some meat. Up to a fifth of his land is under bananas, mainly used for beer. One member of his family may be off-farm seeking work. His life expectancy is 40, that of his wife is 43. He has four living children, his wife is pregnant. One of the living children will not survive childhood. He does not have access to pure drinking water, reliable medical help, regular public transport, and has likely never seen an extension agent. He attends the local Catholic parish. The farm family lives in a single homestead (called a rugo) in reality a cluster of huts, surrounded by a fence and containing places for his animals and a small storage unit. The rugo shares a hill with a dozen other like units, occupied by relatives and kinsmen. The nearest road is five miles, but the hill is connected by a well-developed trail network. The land is now largely tree-

less, apart from bananas, is over-grazed,

and showing signs of gully and sheet erosion."

Average families, like average size shoes, seldom fit. Nonetheless with the homogeneity of Burundi, this description, modified for regional ecological variations, and somewhat updated, provides a reasonably accurate succinct picture of rural life and its economy.

Coffee is by far the main, and often only, cash crop in Burundi. With about 200,000 farm families and 30,000 hectares in coffee cultivation, yields averaging 800 kg. (parchment) / hectare and parchment farm prices of about 116 francs per kilo (OCIBU, 1980) the average coffee grower would have 0.15 hectares, produce 120 kg. and earn 14,000 francs ($156).

Sixty-eight percent of the coffee is grown in three provinces: Ngozi (34.8%), Gitega (18.5%) and Muyinga (14.7%). The annual farm income in these provinces (particularly in Ngozi) is therefore higher than in other rural areas. The remaining 32% is fairly evenly distributed in the other provinces. About half of all farmers in Burundi produce some coffee, typically 100 to 200 trees. With average yields of about one half a kilogram per tree, at current farm prices, income from coffee cultivation on these small subsistence farms range from 5,800 francs ($65) to 11,600 francs ($130) and is considerably below the national average for coffee growers.

Cash crops other than coffee include cotton (8,000 - 9,000 hectares and about 15,000 farmers) and tea (about 2,500 -

3,000 hectares including 1,500 - 2,000 hectares produced on state owned plantations). Tea production is largely limited to three provinces: Bururi, Muramvya and Ngozi. The number of farmers producing cotton is limited by access to market and a cotton gin. Tea cultivation has increased rapidly (in relative terms) in recent years. Tea grown on farms however, is usually limited to those quite close (walking distances) to government owned tea estates which have the essential machinery for processing the fresh tea leaves.

Other sources of income include: sale of home-made beer, wages for off-farm workers (e.g. road repair) and sale of occasional surpluses above family needs of dry beans, peas, manioc or grain. The most frequent family expenditures are for cloth, medicine, salt, spices, hand tools, household utensils, school supplies and, after harvest, for factory-made Primus beer which has the most extensive market out-reach system of any product in Burundi.

Only about 100,000 Burundians work for regular wages, the majority of whom work for the government or parastatal organizations. There is hardly any industrial development except for the processing of agricultural products.

E. Cultural Characteristics of the Population

1. Social Organization

An historical perspective is helpful in any discussion of the current social oranization in modern Burundi. It has evolved from the traditional Tutsi-Hutu caste system involving a complex (though clear) ranking system of superiors and inferiors based upon hierarchial, lord-vassal relatiouships which operated through a feudal land system.

This hierarchy was said to have been ordered by IMANA, the spiritual Supreme Being who is the source of all good in Burundi life. The People's fatalistic attitude and resignation to his will have always been important elements and residuals of those beliefs still affect attitudes towards health. The present day government leaders are aware of these persistent influences; the following quote is found in the introduction to the ECONOMIC AND SOCIAL FIVE YEAR DEVELOPMENT PLAN FOR 1978-82.

> "The efforts of the government in those areas closely connected with rural development and education must have as a final objective, change in our society toward... mental liberation from fatalism and the spirit of servitude."

Historically, among human beings, the MWAMI, the king, was superior to all others. The Mwami had absolute power; the entire country with all its goods were his private property. No individual had rights to power, land or cattle except as granted by the Mwami. He distributed

power and property to his BAGANWA (princes) who became his vassals. They distributed the same to the BATWARE (Captains), the vassals to the Baganwa. In turn, the Batware procured vassals for themselves by giving to their inferiors small plots of land and cattle.

Under the MWAMI there were three castes, the TUTSI, the HUTU, and the TWA. These dilineations are in place today, and the relationships among the castes continue to play a significant role in the development of Burundi in the 1980's.

The Tutsi (approximately 14% of the population) have always been socially the highest ranking, and currently control the government. They were traditionally the masters of the Hutu (approximately 85% of the population) and the Twa (1% of the population). The Tutsi are said to be of HAMITIC origin whereas the Hutu are of the Bantu culture; the Twa are a pygmoid people and considered outcasts.

The Tutsi were and continue to be herders of cattle, an important element of their traditional superior status. While they are said to have been formidable warriors, pre-independence studies indicate they had no need to conquer by force the Hutu, upon their arrival three hundred years ago. The Hutu, traditional tillers of the soil of the hoe culture, willingly became the serfs of the Tutsi in order to receive cattle. The feudal system of granting favors in return for services did provide mobility for all involved including the Hutu. And, in fact, a Hutu could become the political superior of a Tutsi. But the Hutu status as a social inferior has never changed.

Within the tradition, the Hutu farmer was considered the born servant of the superior Tutsi.

This pattern of superior/inferior relationships still permeates most facets of Burundi life. Within each caste there are superior and inferior patrilineages reflecting an individual's rank within his own caste. Men and women together at the higher levels are superior to those, both men and women, of inferior levels. Within each caste men are superior to women, and in general the older are superior to the younger. In women of Burundi: A Study of Social Values Ethel Albert Summed up the ranking of indifiduals as follows:

> Taken altogether, to the childless, youngest daughter of an inferior Twa patrilineage, every other Burundian, without exception, is the superior. During the reign of the MWAMI, every other Burundian was his inferior. An individual's social superiority or inferiority was/is not absolute. It is always determined relative to others. Appropriate behavior and demeaner follow accordingly in a Burundian's relationships.
>
> One important characteristic of a superior is that he/she is in a position to grant favors, as well as take them away. An inferior owes a superior obediance and work and is expected to request favors, a characteristic which promotes pervasive rivalry, and currying for favors by peers competing for the favor

of a superior, i.e. sons competing for a father's favors. Qualities attributed to a superior include height, dignity, elegance, the appearance of self control under any circumstances, intelligence, cleverness, elegant speech and refinement. The inferior is made for work, vulgar, stupid, incapable of controlling emotions or speaking well or extemporaneously. Examples of social stereotypes: "It is said that the Hutu mutter, are incapable of a good lie, and are less intelligent, as shown by their willingness to work for the Tutsi without necessarily receiving anything in return." The Hutu are physically built for manual labor, while the Tutsi are not." "A man (presumably of any status) must be careful not to anger his wife too much during an argument. As an inferior, a woman is physically stronger as well as less able to control her emotions; therefore, she could kill him in a moment of anger."

The Twa, held in universal contempt are "without shame, they eat anything, employ bad language and are reduced to selling pots."

The clan, which is a group of individuals related to one another through a patrilineal line, traditionally was a powerful social grouping. The chief of the clan was the absolute patriarch of all members. Generally members of a clan lived within a close proximity of one another.

The influence of their grouping has been greatly diluted in recent times as members may be scattered at great distances from one another. The chief of a clan may call the members together to make important decisions, but overall the most important and smallest unit of social organization is the nuclear family. The father is the indisputed master of the family. He lives with his wife and children in a rugo (one to three house surrounded by a fence) on the colline near his fields. Regardless of his status in the overall social hierarchy, his wife or wives and children owe him respect and obedience. He is the patriarch with almost absolute power. The father chooses from among his sons, his heritor, prior to his death. Although the eldest son is, according to age, the social superior of younger sons, it is not automatic that he will be selected to succeed his father as chief of the family. Any one of a father's sons may be entrusted by his father with the care and protection of the family.

Traditionally, the father has divided his property among all his sons, which each received not later than the time he took a wife. A son was obliged to build a house for his own family on the land received, which was not far from his father's house. (A son educated and living away from the colline is not exempted from this duty.

As the population density increases Burundian fathers are being obliged to abandon this pratice as the plots of land are becoming too small to divide much further. This is of no small concern, as several

of a father's sons are being forced to leave the traditional homestead to seek employment off the colline, in order to purchase land in less densely populated (and less desirable) regions of Burundi, potentially diluting the strength of the family unit. According to traditional custom, if a man died without designating his inheritor, the clan is called together to select a new chief of the family and to determine the disposition of the man's property.

Ordinarily, a daughter would inherit nothing from her father, although she may have inherited her mother's clothing, jewelry and baskets. In recent years, women have received more liberal inheritance rights.

All a man's children, including married daughters who are duty bound to obey their husbands, are subject to the greater authority of their father. This family is the "community" to which its members owe loyalty, and from which they receive protection. Many families live on a hill, each to a degree, in isolation from one another. There are no villages with a traditional governing body to which members owe loyalty, respect, obedience. Each family is self sufficient and isolated in this respect.

The tragic events of 1972 have served to reinforce this isolation. Families have retreated to the colline, and to the safety of the family they trust. (see section IV,B,2)

One exception to this self imposed "isolation" is the church. Christian missionaries have been active in Burundi since the 19th century. Under both German and Belgian rule, missionaries implemented

health and educational services to the population. To date, Roman Catholic and Protestant missionaries continue to provide these services in addition to religious activities. Their influence is undeniable, though limited as a means of community organization. (see section IV,B,2)

Women are by definition socially inferior to men. Collectively they are respected as the embodiment of fertility, but they rarely have had any authority in the social structure. There have always been, however, and continue to be women who enjoy considerable authority and wealth. Women attain their goals through men.

The ideal woman is modest and subservient, a good wife, mother, housekeeper and always working. She does not speak nor look you in the eyes. Questioned, she may answer, "Ndabizi?" (How should I know?) In public she might deny knowledge of even the most simple information, such as where her husband is at a given moment. Women who are ambitious and intelligent do not seem to be at a disadvantage in having to function in "politics" by indirect methods and in secret. A peasant widow plays politics to obtain a length of cloth or to protect against her "enemies" her rights to her little plot of cultivable land. In a society where cleverness, intelligence and luck are highly regarded, women have been obliged to overcome the apparent obstacle of a patriarchial, patrilinear system in which all the legitimate titles to wealth and power are for men.

Titles and wealth are relative; however, the peasant women must work to her limits to survive, using every resource at her disposal. Most Burundi women, as well as men, are of inferior castes

and poor. To survive, a woman may be obliged to outwit another wife, a husband, a brother, sister-in-law, a father. Success in such an endeavor is not regarded poorly; on the contrary it is respected. Success is the result of cleverness and luck. Traditionally, a woman's caste remains unchanged throughout her life, but her definitive status is determined by her marriage.

2. Attitudes toward Health and Fertility

a. Women/Marriage

A woman's marriage is of central importance to her life. Young girls look forward to marriage as it denotes an immediate rise in social status, from that of a childless female child. A woman is, however, aware that marriage involves a lifetime of work for others. She moves from being under the authority of her mother to working for her husband and if she is "unlucky" her mother-in-law.

In general, men marry women of the same rank or higher. For a man to marry a social inferior would require that his status be lowered to that of his wife. Family pressure against this would be intense, even today. A woman may marry a man of her own rank or lower.

A marriage between a woman and a man inferior in rank to her is not without problems, particularly for the woman, i.e. A poor Tutsi father might arrange a marriage for his daughter to a wealthy Hutu. The father would receive the brideprice (probably cattle). She would retain her rank, though "she would feel she had married beneath her." Obedience and respect required of her as a wife, to a husband of inferior status, would constitute a seriour humiliation. And in a society so markedly

patrilinear and patriarchial, her children, of course, would be Hutu.

Recent law frees men of the obligation of paying the brideprice to his future father-in-law to insure the legitimacy of the marriage. The custom continues, however, as both men and women feel "more at ease" knowing the dower has been paid. For the husband, they dowery "purchases the children born during the marriage", and for the woman, it is a measure of her value. For both, it is a symbol of security. Divorce or repudiation require that the brideprice be returned. Young Burundians of marriageable age repeat that divorce would be more frequent if the dowery were eliminated.

Traditionally, the Tutsi brideprice was paid in cattle, the Hutu in hoes (though cattle were/are always more desirable). Today cash is acceptable though "if a girl has an old father, he may prefer cattle." The groom then purchases a cow.

Cattle are a symbol of wealth and used as a medium of exchange; they are not kept primarily for food, although an old cow who dies a natural death is eaten. A large number of Kirundi words deal with cows, their traits and virtues. Burundians in the interior tell time in relation to the activities of their cows. Traditionally part of the brideprice, Burundians have a strong attachment to their cattle. One proverb states: "Imana created cows and children." All cattle are dedicated to Imana and are said to be possessed of him.

There is some dispute over the relative value of women and cattle although it is said that, "To have good cows, a man must have a good wife." When cows are brought into the rugo at night, it is the wife who brings water and grasses. It is she who cares

for a sick cow and all calves. A woman or female child who has reached puberty will never milk a cow, only boys and men are permitted this important duty.

The social division of labor assigns to women near total responsibility for anything that is related to food, small children, and the house. Traditionally men were frequently away from home, grazing cattle, in the military, working for a lord whose fields were far from a serf's own plot of land, etc. The wives of a polygamist were in turn alone as well. This pattern continues today. It is estimated that fully one third of the households in Burundi are completely managed by women, as men are obliged to seek work elsewhere to earn money. A woman's responsibilities includes: all aspects of cultivating her husband's fields, preparing and planting, periodic weeding of peas, beans, millet, harvesting of two or three crops per year, transporting the harvest to the rugo (on her head), the cleaning and storage of the harvest, brewing of sorghum and banana beer, meal preparation, care and instruction of young children, the daily gathering of firewood, provision of water (for which she may walk up and down the hill, four to five kilometers, two or even three times a day), caring for sick children and cattle, care of milk and making of butter, collection of cow dung for fertilizer, care of house and yard, any duties a mother-in-law might assign, and in her spare time, a good daughter returns to her father's rugo to help her mother with any of the above.

A woman with no children or children of young age does all of this herself, and if she is "lucky", she is pregnant or nursing a child. Later on the children assume some of her tasks.

In all other things inferior to her husband, a woman is absolute proprietor of the family food supply. The land she farms is her husband's. He decides what will be grown, gives her orders to work, and inspects the granaries and pots of butter. However, he is strictly forbidden to take so much as a handful of beans without his wife's permission. This would be considered a very grave offense and men say it is just not done, "No one would drink with such a man." If a man needs food for any reason, he must grow it himself. The household food supply is always in control of the wife, although apparently, its is the rare wife who refuses her husband as long as he follows the correct procedure of requesting rather than taking.

Polygamy has been outlawed in Burundi and sources insist its occurence is marginal. A man may only register one marriage legally. However, with a large number of men off the farm for at least part of the year, inevitably a man takes a "wife" or "concubine" (depending upon who you speak to), and children result, aggravating an already difficult economic situation. A common complaint among women is that the money earned by off-farm labor is used to support the second family. The wife back on the colline meanwhile is not only producing food, but probably tending to her husband's coffee trees. After the harvest and

sale, he (and this is within his rights) might verv well return to the colline, his money and leave again. The final result is that salary from off-farm employment as well as revenue from cash crops, is not being used to improve the quality of life on the family land. Already limited resources are being spread even thinner. Thus, unless a woman is shrewd, she is the producer who receives very little in return for her labors. One source states angrily that "these women don't even have money to buy soap." The Kirundi word for "wives" is "abakeba" which means rivals, and, in fact, they are forced to be in order to survive. Trained never to complain in public, "elles se taisent."

b. Attitudes toward Fertility

Fertility is one of, if not the most, pervasive social values in Burundi. It is a central focus around which much of a Burundian's life revolves. Equally important for men and women is parenthood. One proverb states, "the greatest sorrow is to have no children to mourn for you." A foreign educated physician stated succinctly, "Children are our wealth." Burundi is one of the few countries where the desired number of children (8) exceeds the actual number (6) per family.

Male and female sources agree that a man does not feel a man if he has no children. He must have sons, the more the better, to insure that he will have a heritor to succeed him, to continue the patrilinear line, and sons to whom he will leave his property. Daughters are valued as well, for the brideprice

they bring. Tradition holds that the male role is more important than that of the female in procreation. "Woman", says an old proverb, "is only the passive earth. It is the man who provides the seed."

For women, the situation is clear. Socially inferior to men in the traditional caste system, her value and corresponding status in the system, is measured by her ability to bear children. A woman's survival is through men, and fertility is a woman's guarantee of security. Male and female sources again agreed, "a woman who has many children is at ease; a woman who has many sons is secure". It is unlikely she will be "repudiated" or divorced. Sterility is always considered the fault of a woman.

The consequences for a woman who does not conceive or who bears too few children are always serious. (A woman will always have water in the house at night for Imana, in hope that he will make her fertile.) Normally a woman will be sent back to her father's house in disgrace, a divorce occurs and most of the bridesprice is returned to the husband. "A man gives the bridesprice to have children." He remarries. If a man can afford it, he may "permit" the childless woman to stay, while he takes a second wife. This is a less common and definitely undesirable situation for any woman. A woman divorced because she has not conceived may marry again. If she bears children, all is well, if not the process may very well repeat itself.

"Women are symbolically one with the earth." As vessels of fertility a range of taboos exist to protect her. "Within her, woman has all the potentials of life". She fulfills her role in society by bearing children. If she performs her duties well, fecundity may be transmitted to the seeds she plants, bring prosperity to all. As part of the harvest rites, honor is accorded to a young maiden in respect for her potential of life.

In a society where the giving and receiving of gifts and favors is central, Ethel Albert states, "A nursing mother is the symbol of feminine generosity". When a long desired child is finally born, it is said of the woman, "Imana has removed your shame". Happiness is - many children, a good harvest, a cow which gives much milk - all symbols of fertility and the mark of the favorites of Imana.

A woman who bears many children need not fear being replaced, "another woman would not be interested in marrying a man with many children". (A father generally keeps the children, especially sons, once they are weaned.) And a woman knows her sons will always provide for her, as children owe their parents respect and obedience.

A woman returned to her family should be provided with a small plot of land to cultivate for herself. Apparently though, the land is usually already divided among her brothers. A brother must take her in. However, one highly placed woman stated that "she

becomes the slave of her sister-in-law, who in turn might face the same situation".

Several sources have verified that fertility is so valued that old women will deny that they are past the childbearing age, even if they have borne and raised many children, so afraid are they of being repudiated.

Ideally, a woman has one menstrual period after her wedding (to prove she was not pregnant before), afterwhich pregnancy is desirable. A woman should be a virgin prior to marriage. An unwed mother-to-be potentially faces very severe consequences. Shotgun weddings are not uncommon in these circumstances, if they can be arranged through the two families; this is the best solution for the girl.

Traditionally, an unmarried pregnant woman was killed, or taken away and hidden by a relative. Today she might be sent away, or run away; the disgrace is so severe.

There are old women who perform abortions, but there are great taboos against it and the penalty in 1981 is prison for the mother. In addition, a woman who has born an illegitimate child may have great difficulty marrying. The child is often in limbo. He does not become part of his mother's family as he is not an extension of the trilinear line. Sources indicate that the child is frequently sent to the family of the father, where he may be neglected, although a "good" father will see the child is provided for. If the mother does marry, she will not take

the child with her to her new husband's home. Often he will remain with his grandparents.

It no longer appears to be common, but the museum curator in Gitega stated that in the past, young unmarried girls were required to be bare breasted to prove that they were not pregnant, and therefore virgins.

Strong incest taboos forbid all contact between a father and his daughter after she has been weaned. Except for mutual greetings and several minor services a daughter performs for her father, all communication passes through the mother. A father will never punish a female child, that is always left to the mother. Even after a daughter's marriage, a father is prohibited from entering his daughter's house. Incest taboos are strong enough to provide the basis of an oath in court, "If I lie, may I do that act with my daughter named...".

While fertility and many children are of paramount importance to Burundians, there is one indication that enough is enough. After the sixth child, parents give their children numbers for names, seven....., eight....., nine..... ten....., the eleventh is named Misago which means something which goes too far, is a little too much, as when "you have a full glass and there is just a little more beer in the bottle". The 12th and 13th are named Ijana (hundredth or many) and Niboyou (cease) which is a prayer to Imana to stop the superabundance of gifts.

After birth, a mother and her newborn are isolated from six to eight days. At this time the child is presented to the family. The mother is honored and gifts are presented.

c. Attitudes towards Health

In rural areas many of the Burundians' attitudes toward health are dominated by fatalism and resignation to the will of Imana. Each must do what he can with whatever Imana has given him. There are many who are unfortunate, including the sterile and sick. They do not have the favor of Imana and their misfortunes are sent by him when he is in a bad humor. This fatalistic acceptance of all misfortunes, including poor health, is called "Agasambi."

In the rural areas, concept of communicable disease is unknown. Severe epidemics of measles are common, and as one nurse explained in frustration, she fears many children catch measles at the health center. While children with measles and their mothers are isolated at the centers, it is common to find a mother with her baby on her back visiting her friends in spite of attempts by health personnel to keep measles cases separated.

Most rural Burundians believe in the spiritual cause of disease and are resigned to their inability to modify the course of nature "Imana is the giver, everything rests in him." reflects a Burundian's fatalistic approach to the future and trust in the goodness of Imana.

A child's death is frequently assumed to be the fault of malicious spirits. If a family loses several children in infancy, they may guard against further losses by giving the child an unsavory name that will be unattractive to the spirits.

Disease and ill-health are frequently thought to be caused by poisoning. An individual must constantly protect himself from poisoning by his enemies. Unlike other African countries where eating is such a social event and anyone passing by at mealtime is invited to eat, a Burundian will only eat with people he knows well and trusts, for fear of poisoning. One's enemies can consult a witch (generally a woman) to purchase poisons which are put in food or beer.

The witches are held responsible for any disaster; unaccountable deaths, epidemics, sterility. One's enemies can consult a witch to render a woman barren, a man impotent, etc.

One's physical well-being frequently depends upon observation of ritual taboos, some of which are universal, others individualistic and self-imposed, i.e. taboos prohibiting the drinking of milk or eating of certain kinds of meat, individual taboos for pregnant women set after consultation with a traditional healer.

In general good health is the favor of Imana and is maintained by luck. Certain diseases such as leprosy,are thought to be punishment for something done by an individual or his ancestors. Lepers who are disfigured are outcasts and housed apart from the family. Upon the person's death, the

house is burned. It is thought that the "punishment" is passed from man to man and a man passing it to a woman signifies the end of leprosy in the family.

A rural Burundian who is ill will seek help from a traditional healer who is usually expert in curing a specific type of disease. Those who seek help at medical facilities either have already seen a traditional healer, are seeing one simultaneously, and if modern medicine does not provide relief, will continue to seek traditional cures. One source stated that a rural Burundian will go to a dispensary for "a simple ailment" but to a traditional healer for anything "prolonged or complicated". Traditional techniques are preferred because of the belief in the spiritual cause of illness.

Modern medicine is represented by facilities lacking in supplies, personnel who are inappropriately trained and supervised, and in the words of one source "motivated by their inability to diagnose and treat, to maintain the mystique of a healer by guarding all knowledge to themselves". One may surmise that modern medicine has not shown itself superior to the traditional and one might expect traditional beliefs surrounding health, cause and prevention of disease, remedies, etc. to remain strong.

3. Indigenous Health Practices - Role of Traditional Medicine

Traditional health practices are strong in Burundi. As in all cultures, there are those to be encouraged, those to be worked around, and those to be acknowledged, but left alone as they are neither positive nor negative in their effect.

Health services are not resisted, but their effectiveness is inhibited by the individualistic nature of the society, the scarcity and overall poor quality of health services provided at the rural level, and the almost total lack of outreach. It is not surprising, therefore, that a traditional solution is frequently sought before a modern one. Not to be forgotten is the basic fatalism and resignation to man's inability to change or control his destiny.

People are not inclined to talk about traditional practices, and many deny their import in modern Burundi. This reluctance is due in part to the intimacy of the subject within the culture and may in part be due to church doctrine and the attempt by the Belgian colonizers to repress traditional health practices.

Traditional healers are called "Umuganga". They are herbalists and highly respected practitioners. Their skills are most often passed from generation to generation within a family. Some are especially well known for their ability to cure specific ailments. These healers are specialists and do not treat everything,

only those disorders falling within their range of skill. One woman has acquired such a reputation for treating mental disorders, the government has provided her a facility from which to work. An attempt is being made at the University to study the properties of the plants and herbs used.

A woman desiring children will consult a healer, who will provide her with herbs and precise instructions on their use, to increase her fecundity. There are herbs to regulate a woman's menstrual cycle, to prevent miscarriage, to insure the birth of a beautiful baby, to stimulate lactation and to cure gonorrhea. Some of these mixtures are ingested as tisanes and others applied externally.

Herbal tisanes and enemas are widely used to treat worms, diarrhea and as laxatives. Health personnel express concern that mothers too frequently give their children enemas. Several days prior to delivery, a pregnant woman will give herself enemas as well.

Other traditional medicines are prescribed to treat migraines, cold, wounds, burns, fevers, coughs and asthma.

It is said that there are "old women" who perform abortions, using herbal mixtures and massage. This practice is strongly disapproved, and a woman would resort to abortion only in the most extreme circumstances. Sources queried all indicated knowledge that abortion occured but no one knew how widespread it was/is.

In addition to the "umuganga", Burundians consult "Umufumi". They are considered medical practitioners and possess powers to ward off misfortunes and disease caused by malevolent spirits. The"umufumi"has the ability to see into the future of a patient, can predict misfortune and offer a solution to prevent it. He is also an expert in curing, "using external application of medication in the form of amulets tied over the ailing part of the body . Modern medicines may be wrapped in leaves and strapped to the area of illness. Internal medication is used only if the patient's condition does not improve after external treatment." This passage from the Area Handbook was verified by local sources. (Health personnel working in dispensaries have found that a patient, 1) prefers a shot to a pill and 2) wants the shot given in that part of the body which hurts.)

The "umufumi" will also transfer supernatural energy to charms made of sticks and hair or horns of animals. People use amulets for luck in hunting, finding a wife or curing sick cows. Special amulets are made for infants to insure their health; pregnant women will receive amulets to protect their baby during pregnancy. She also receives instructions in food taboos.

The "umufumi" also has the ability to identify a person operating as a witch and to prevent him or her (though most are said to be women) from harming others.

One highly placed source said of sorcery that: "everyone will say it is no longer practiced, or men will tell you it is

only women who believe in it, but sorcery continues to exert a strong influence in a Burundian's life".

Witches are thought to use poison and practice "contagious magic" using a piece of the victim's body (hair or a finger nail paring) in order to gain power over a person's soul. For example, if someone hates you, she can go to a witch to prolong a pregnancy. A "gusagiza" is a pregnancy which lasts more than nine months. The women of some clans in certain areas are known for it. Pregnancies said to last ten, eleven or twelve months are not uncommon, some are believed to last up to fifteen-months. (One explanation suggested for this phenomenum is anemia, irregular menstrual periods, plus the idea that a woman does not recognize an alternative condition to pregnancy or nursing mothers.)

An enemy may also consult a witch to make another woman's pregnancy disappear. Some women say they were pregnant, but the baby somehow wandered to another part of the body (i.e. the head) preventing its development.

Ideally, a woman would like to be pregnant every two years (although a man whose wife conceives more frequently is accorded a great deal of respect). A nursing mother immediately removes an infant from her breast when she becomes pregnant, as it is believed her milk is no longer good for the baby and will cause illness (diarrhea is most frequently cited). Abrupt weaning

often results in malnutrition as Burundian mothers do not prepare special foods for their babies, and the children are immediately introduced to an adult diet. (i.e. They are fed beans which may not be thoroughly cooked and unskinned.) A child who refuses such food goes unfed. Women do wish to prolong the period of nursing. However, a woman who does not conceive after two years begins to worry.

Although Burundians do own goats, they are not kept for milk,and attempts to encourage mothers to give their babies goat's milk are met with resistence. They will give children cow's milk (though fewer families own cattle).

Wet nursing is strongly resisted. If a mother should die or have no milk, another woman will not wet nurse the baby, even a woman within the family. Very occasionally, a woman may be persuaded to wet nurse another woman's child, but only if the child is the same sex as her own. It is said that a woman who has a boy and who wet nurses a female child, will dilute her son's maleness by sharing the milk. All sources, male and female, agreed that wet nursing was extremely rare; no one could/would expalin why. In certain areas, the traditional taboo against boiling cow's milk remain strong (certain areas of Muyinga province have been cited, with the correlating incidence of tuberculosis). It is believed that to boil a cow's milk will harm the udders so she will produce no more. One source told the story of his father, a teacher, who had no cows of his own; milk

was purchased for the family from local herders and was boiled before use. When the herders discovered this, they refused to sell milk to the family. Attempts to explain were futile. The herders stated that boiling milk was "the practice of the foreigner and he doesn't understand cows". To provide milk for his family, the teacher was obliged to purchase his own cow.

Most children are born at home. A mother is attended by female members of her family or a traditional midwife. Sources indicate that any sharp implement may be used to cut the umbilical cord. Health personnel feel that there is a high incidence of umbilical tetanus though there is little statistical data to support this. There is a word in Kirundi to describe the symtoms of tetanus, "kidudarara". However, it is also used to describe meningitus and other disorders with similar symtoms. Reporting of infant deaths due to tetanus would be low as an infant who dies shortly after birth would be buried near the rugo, and it is unlikely even his birth would be registered. Birth and death are extremely intimate areas of family life. Traditional practices, apparently, do not, however, include placing dirt on the umbilical wound.

After birth, the child is washed in cold water and rubbed with butter. As protection against evil spirits, the placenta is buried and the cord is kept as an amulet. The infant's limbs are massaged to insure their proper development. Soon after delivery, the father is obliged to bring food to his wife, afterwhich she immediately begins to nurse.

Mother and baby remain in seclusion for six to eight days. After this period, the child is presented to the family, gifts received and the mother is honored. A child may not be named until he is growing hair, learning to walk and the danger of early deaths is decreasing.

One source stated that it is believed that sexual intercourse will help a woman heal after delivery and an episiotomy. How widespread this belief is, she did not know.

There are few rituals or organized social activities for the maturing child, no circumcision or clitoridectomy are associated with "bukura", the transition from childhood to puberty (from 12 - 15 years of age). Marriage generally occurs relatively late (late teens or early twenties or until the male has earned the brideprice).

II. - Health Status And Relationship With Development

A. General Disease Patterns

The patterns of disease in Burundi can be described most conveniently in relation with the country's three major geographic-ecological zones:

1. The western, low land Plains which includes the area bordering on Lake Tanganyika and the Valley of the Ruzizi river north of this lake.
2. The central high altitude Plateau, which lies east of the crest of the Nile and Zaire rivers, which unequally bisects the country on a north-south axis.
3. The eastern slopes which merge on the east and south with the savanna and low lands along the frontiers of Tanzania.

The Plains and the Ruzizi Valley

The western lowland plains have a warm, humid climate, numerous streams draining into Lake Tanganyika in the South and into the Ruzizi River in the North. The Ruzizi Valley is the area where the most extensive irrigated farming occurs, including the cultivation of rice. The tropical climate, the numerous streams and irrigation ditches foster the breeding of mosquitoes and the growth of snails. The typical high-land Burundian pattern of family rugos scaterred on hill tops is modified. To the South between the shore of the Lake and the lower slopes of the mountain, there are frequent aggregation of houses which tend to be either near the Lake shore for fishing or strung along its tributaries. In the Ruzizi Valley there are a number of Paysannats (farm villages) partly created intentionally by the Ministry of Rural Development in response to the requirements of tract-irrigated farming.

Sanitation facilities and the provisions for drinking water are under-developed. The streams and irrigation ditches become readily polluted with feces since sanitary concepts and practices of the people are rudimentary.

The western Plains areas has had considerable in-migration. The capital city of Bujumbura near the north end of the Lake attracts young males seeking work because of increasing population pressure and decreasing land fertility in the high-lands. This has created a lateral extension of the city of Bujumbura and the creation of new semi-urban densely populated quarters at the periphery, such as Musaga. Provisions for water supplies, drainage, and feces disposal have not (except recently in Musaga) kept pace with needs and sanitary conditions are generally poor. In addition to the well established steamship route between Bujumbura and the railhead at Kigoma in Tanzania, there is considerable unregulated small boat traffic between the Tanzania lake-side villages and Bujumbura in the north and Rumonge in the south. Also, there is frequent clandestine entry, casual visiting and trading from the Zaire areas across the lake particularly from Uvira (a fishing village) and Kalemie. (Exchange of food and drink products, e.g. Primus beer from Burundi for dried fish at Uvira, is common).

Consistent with these ecological factors, the Plains have a high incidence and prevalence of diarrheas, intestinal parasites, schistosomiasis and malaria. It is also vulnerable to the introduction and spread of acute virulent intestinal epidemics such as cholera in 1978. On the other hand, because of the fertility of the soil and the availability of fish, caloric-protein malnutrition is less common and less severe than in most other areas of the country.

The High Plateau

The highlands areas have a cool and often cold climate depending on altitude and winds. Warm clothing such as a sweater or a jacket is often needed. Frequent rains with relatively low temperature combined often with inadequate clothing make the people susceptible to chilling. Respiratory infections, bronchitis and pneumonia are predominant disease patterns in adults. Complications such as otitis media and pneumonia are frequent with measles and whooping cough in infants. Asthma and arthritic diseases are also common.

The people tend to live scattered on hills (collines) in typical rugos. Water is procured from a variety of small sources, often natural springs, which are less prone to pollution. Diarrheas and other intestinal diseases are less frequent than in the western plains and more confined to infants and small kinship groups. Hookworm, because of feces contamination of the soil, is however high.

On the other hand, population density is high although dwellings are spaced. Overcultivation, excessive grazing and erosion have decreased the amount of, and the fertility of, arable land. Food production is marginal in some areas and primary caloric-protein malnutrition is probably somewhat more common than in the low land Plains. There are, however, no nutrition surveys or other reliable data on the nutritional status of the population in different areas of the country. Malaria cases are fairly common because of the frequent movements of the population into the Plains.

Mosquito density is relatively low at the high altitudes and it is generally (although not universally) accepted that malaria transmission does not occur.

Louse-boorne typhus is occasionally reported and is considered endemic (the central laboratory at Bujumbura has never confirmed a case bacteriologically or serologically, although it has the capacity to do so).

The Eastern Slopes

As the central highlands slopes off to join the low hot swampy area of the Mosso in the south and the higher savanna and plain areas along the Tanzania border in the east, mosquito breeding becomes more intensive and malaria transmission occurs. Malaria is one of the most common cause for out patient visits and hospitalization at the hospital in Ruyigi.

The land to the east and southeast of Gitega, which has low ridges and valleys radiating to the east and southeast, becomes progressively poorer. Population density decreases and food crops become predominantly manioc and maize. Primary caloric-protein malnutrition is more evident, particularly among toddlers. Substandard nutrition and diets low in protein, when coupled with repeated bouts of malaria and the contagious diseases of childhood (particularly measles), cause a heavy death toll in pre-school children.

To the north of this eastern region in areas around Muyinga the elevation remains higher and the descent to the savanna more abrupt. The soil is somewhat more fertile than that around Ruyigi and cash crops, particularly coffee cultivation, are more common. Malaria transmission, however, is high and the food crops are predominantly the low-protein tubers: manioc and taro.

Caloric-protein malnutrition in preschool children is also common.

This area, and the swarmy lowland areas northward around lake Chohoha and Rweru near the Rwanda border, are infested by the tsetse fly. Until recent years trypanosomiasis (African sleeping sickness) was commonly found; because of control measures, only a few human cases (less than ten) have been diagnosed in recent years but the tsetse fly vector has become established and a potential problem of recurrence of trypanosomiasis exists in this area.

B. Mortality and Morbidity Data

There is no quantified information representative of true mortality or morbidity in Burundi. The available data is presented from three sources, which are summarized in separate tables as Annexes 23, 24 & 25. These include:

1. The reportable diseases, reports made to the Ministry of Public Health.
2. Diagnosis of hospitalized patients from Burundi's 23 hospitals in 1978 and 1979 (9 most common only).
3. A WHO sponsored study of causes of deaths in different age groups: Weisler, "Etude sur quelques parameters demographiques et sanitaires au Burundi" June, 1976.

All these sources are based on patients seen at fixed installations (mainly hospitals) and are subject to the usual sampling bias associated with such data. The reporting system too is mainly responsive to communicable diseases, particularly those under epidemiological surveillance. Other non-infectious diseases are therefore under-represented.

The above data was supplemented by interviews with medical chiefs of the regions, medical chiefs of sectors, various health officials at national, regional, sector and health installation levels as well as selected foreign collaborators.

Information concerning the cholera epidemic of 1978 was obtained mainly from a paper published in the Annals of the Belgian Society of Tropical Medicine: "L'Epidemie de cholera au Burundi en 1978", Ann. Soc. Belge Med. Trop. 1979, 59, 413-425, and from interviews with two if its authors: Dr. B. Storme and Dr. D. Barakamfitiya, both of the Department of Epidemiology and Laboratories, Burundi Ministry of Public Health.

Information concerning trypanosomiasis and tsetse fly infection was obtained from a paper in preparation for publication by Dr. Perrich of the French medical mission at Kimazi, Muyinga Province and from interviews with the author.

What little is known about the distribution and epidemiology of malaria in Burundi was obtained from conversations with Dr. Storme, of the Department of Epidemiology and Dr. Marc Gooseman, an entomologist from the Institute of Tropical Medicine at Anvers who arrived in January, 1981 to begin a longitudinal study of malaria in the Ruzizi Valley. No previous study has been done. Hopefully this is the beginning of a long term effort to delimitate the malaria areas, determine its rate of edemicity, identify the anophelline vectors and their habits, and to study alternative methods for malaria control in the West Lake Plains and Ruzizi Valley areas. A summary description of this new Belgian assisted project is included in Annex 26 .

Other information was gained by site visit to a wide range of hospitals, health centers and dispensaries, where out-patient logs and laboratory findings were briefly reviewed to

determine the apparent morbidity patterns. The observations made and conclusions reached described in the next section are based on best informed judgements stemming from a synthesis of the information obtained from the above sources of information.

C. Principal Diseases

Using the information available described above, an attempt was made to rank the importance of the public health diseases occuring in Burundi. The results from this analysis is included in Annex 27

For the country as a whole, the four most frequently reported diseases in 1979 (incidence) were malaria, influenza (which includes pneumonia and other serious respiratory diseases), measles and severe diarrheas. Health officials in the western plains and the eastern area both ranked measles first and malaria second. In the central highland area, respiratory infections, including pneumonias and influenza, were ranked first with measles second, whooping cough third and diarrheas fourth.

Mortality data was only available from the epidemiology reports. For the country as a whole, the frequency of causes of deaths reported (mortality) are ranked: measles first, tetanus second, malaria third, cholera fourth and diarrheas fifth. The ranking of tetanus as second was unexpected and probably reflects more complete reporting of deaths from this disease. However, deaths from tetanus may be more common than generally appreciated. Health officials in the western plains and the

eastern areas ranked mortality from measles first and malaria second with diarrheas and respiratory infections in either third or fourth position. In the central highlands, deaths from respiratory infections were ranked first with measles second, whooping cough third and diarrheas fourth reflecting the effects of cold weather.

Weisler's 1976 study of disease patterns as a percent of deaths by age, although it is obscured by the large percentage included in the category "other diseases", neverthless confirms the high percentage of deaths from acute infectious and parasitical diseases. (See Annex 25 .) This is particularly apparent in the age group 2 - 4 years where only 7% of deaths were assigned as "other diseases". If pneumonia and gastroenteritis are included under "Infectious and Parasitical Diseases" then 65% of death in the 2 - 4 years group would be due to these diseases. 28% of deaths in this same group are attributed to malnutrition. The combination of infections, parasities and malnutrition would therefore account for 93% of all deaths in toddlers and preschool children. Similarly, these diseases (53% infectious and parasitical, plus 20% malnutrition) cause 75% of deaths in the primary school children (age 5 - 14.)

It is reasonable, despite the inadequacies of the data, to conclude thac by far the greater majority (probably 80% - 90%) of deaths in children are due to acute infections and parasitical diseases (mainly measles, whooping cough, pneumonias, malaria and various types of diarrheas), and

that perhaps about 25% of these deaths are preceeded by, or associated with, malnutrition. As in all countries where similar patterns are found, it is very difficult to determine whether malnutrition is a predisposing cause of the high death rate or the result of repeated infections and parasitical infestations. Longitudinal studies using wt./growth for age curves in representative areas combined with studies of child feeding practices would help to clarify this question. Unfortunately, the usual quick type of national nutritional survey will not provide the information or insights needed.

Other diseases of public health importance are intestinal parasites, tuberculosis, poliomyelitis, cholera and schistosomiasis.

Every age group, regardless of age, in the rural areas, is heavily burdened with the common round worms including ascaris, strongyloides, trichuris and hookworm. Hookworm, the most serious of these, is found in 15% - 30% of stool specimens in some areas, depending on age group and locale. This is the usual pattern throughout central and western Africa and reflects the low standard of sanitation, particularly feces disposal. Both beef and pork tapeworm infestation are prevalent in local meat. However, the rural Burundian eats meat only occasionally. Tapeworm infestation therefore is primarily a disease of expatriates and urban upper income Burundians. The infestation

rate for tuberculosis is unkown. About 400 cases are reported a year but this is relatively low and there is undoubtedly serious underreporting. All types of infections including pulmonary, cerebral, glandular and osseous are found. Milk is the common source of infection in many areas. On balance, however, tuberculosis does not appear to be as great a public health problem as in many other African lesser developed countries. Dr. Perrich (French medical mission), who has done epidemiological studies in Muyinga Province (northeast area), concluded that tuberculosis rates are not substantially higher than those found among the poorer urban population of Paris. Nevertheless, because of its chronicity and long period of treatment and surveillance, tuberculosis is a disease of considerable social and economical importance.

Doctors and health staff in rural areas perceive polio infections as a rare occurrence, and only about 30 cases are reported a year. However, the relatively large numbers of people seen with typical residual affects of polio suggests that Burundi has a substantial polio problem.

Schistosomiasis is primarily found in the west plain area including the areas adjacent to Lake Tanganyka and the Ruzizi River Valley. Only the intestinal forms are present. A review of laboratory reports at the Rumonge Hospital showed about 3 - 5 positive stools per week. Schistosomiasis causes

long term disability and usually requires prolonged treatment. It has high economic significance because of its relationship with irrigation farming particularly in the Ruzizi Valley area. The new Belgian project, with assistance from the Institute of Tropical Medicine at Anvers, plans to institute area studies and research on control measures in the Ruzizi Valley, beginning in early 1982.

The health officials and field staff in Burundi are particularly aware of the danger of cholera because of the 1978 epidemic. Cholera was first introduced into Rumonge on the Burundi lake shore about 75 km south of Bujumbura from Kigoma, Tanzania about May 25, 1978. At first, cases were confined to those areas within a 15 km radius of Rumonge (pop. 10,000). In June, 1978 cholera was introduced into Uvira in Zaire on the Tanganyka lake shore opposite Bujumbura, also by boat passengers from Kigoma. Cholera on the Zaire side spread to the south along the west shore of the lake and infected Kalemie. There is considerable commercial traffic and population movement between Uvira and Bujumbura. Uvira produces sugar and dried fish; Bujumbura produces beer, and these products are constantly being bought and sold or exchanged. The epidemic spread into Bujumbura where the peripheral quartier of Musaga was most severely infected with 721 cases. In the center of Bujumbura, where there is a central water distribution system and latrines, there were few cases. Sanitary conditions in

Musaga at that time were rudimentary with only about one piped water faucet per 10,000 inhabitants and few latrines.

Cholera spread into the Ruzizi River Valley infecting the villages of Kabulantwa, Bubanza and Rugombo. Only small foci broke out south of Bujumbura in mid-July 1978, probably because houses are more spaced. Also in the interior, there was only a few scattered cases and no contagious spread probably again because of the traditional spacing of rugos and collines and the multiple water supply sources (mainly springs). The number of cases seen and treated are summarized below (pop. affected about 600,000).

1978	MAY	59 cases			
	JUNE	307 cases	15	deaths	(4.1%)
	JULY	1,186 cases	39	deaths	(3.3%)
	AUGUST	1,922 cases	60	deaths	(3.12%)
	SEPTEMBER	2,155 cases	77	deaths	(3.57%)
	OCTOBER	1,748 cases	42	deaths	(2.4%)
	NOVEMBER	690 cases	9	deaths	(1.3%)
	DECEMBER	230 cases	6	deaths	(2.6%)
1979	JANUARY	19[illegible] cases	6	deaths	(3.06%)
	FEBRUARY	63 cases	1	death	(1.6%)
	MARCH	40 cases	0	deaths	
	APRIL	19 cases	0	deaths	

The 1978-1979 epidemic was a classic example of the effect of ecology and environmental sanitation on the spread and

containment of cholera.

Trypanosomiasis, (African sleeping sickness), has until recently been endemic in the northeast province of Muyinga, in areas adjacent to the frontier of Tanzania. There was a second focus in the northeast near the small lakes area north of Kirundo, adjacent to the Rwanda border. There have been no cases in the past 2 years but the tsetse fly reservoir persists and, therefore, there is a potential for the recurrence of trypanosomiasis in this area.

D. Economic Cost of Poor Health Associated with Common Communicable Diseases

The most common causes of sickness in Burundi are: diarrheas, malaria, (in some areas), measles, whooping cough, influenza (which probably includes a variety of respiratory and unspecified viral diseases as well as common grippe), pneumonia and intestinal parasites. This analysis focuses on these seven most common illnesses and tries, despite the inadequacy of the morbidity data, to quantify the recurrent annual cost of these diseases in respect to one factor: the cost of the essential drugs required to effectively treat them. This factor was selected not because it is the most expensive item in a health budget, but because the availability of essential drugs is usually considered the life blood of a health care service, particularly in a lesser developed country like Burundi. Nonetheless, prevention of communicable diseases when feasible, is the obvious measure needed to reduce the burden on the people and on the government's recurrent health expenditures.

The methodology used is simple in theory but somewhat difficult and perhaps foolhardy in application in a country like Burundi, where valid epidemiological data is so scarce; however, one must use what information is available.

The essence of the methodology is expressed in the following formulation: Incidence times drug cost for one case = disease annual drug cost.

The price of essential drugs in Burundi is based on the standard price list of the National Office of Pharmaceuticals (ONAPHA), a parastatical drug production firm in Bujumbura that manufactures finished drug products from imported bulk ingredients. Production of the essential drugs are now, or should be, in the future, adequate to fulfill country-wide needs (see ONAPHA planned production of essential drugs in 1981, Annex 28). The true incidence of any of these diseases in Burundi is unknown; this item in the formulation therefore must be based on estimates of order of magnitude. The bases for these estimates of incidence for the seven common diseases are included in Annex 29, Exhibits A thru G.

Although the figures used are stated precisely, the reader should not regard them as accurate incidences of these diseases. They are based on certain assumptions; if the assumptions are changed the annual incidence figures will change accordingly. Also, if the cost of an essential drug changes the annual cost of treating a disease will also be changed.

The results of these calculations are summarized in the table that follows.

(see Table on next page)

Estimation of Annual Cost of Drugs to Treat the Seven Most Common Diseases in Burundi

(figures rounded off - values in thousands FBu and US dollars)

DISEASE	Est. Annual Incidence (Cases)	Annual Drug Cost	
		In FBu	In Equiv. US$
Diarrheas	275,000	12,625	141
Malaria	243,752	11,167	125
Measles	156,859	8,392	94
Whooping Cough	94,636	11,593	129
Influenza (includes a variety of diseases characterized by fever and muscular aches)	623,916	30,073	336
Pneumonia	92,561	26,102	291
Intestinal Parasites	899,383	37,341	417
TOTALS	2,385,112	137,293	1,533

Comments:

If the total estimated annual incidence of these seven diseases (2,385,112 cases) are allocated to the total population of Burundi* (4,041,615), then the annual infection rate is 0.59 cases per year. However, since 5 of these diseases (diarrheas, measles, whooping cough, pneumonia and malaria) occur predominantly among or are most apt to produce serious sickness in children 1 - 4 years, (pop. 524,730*), the rates from these diseases were calculated separately for this age group with the results shown in the table below:

DISEASE	Est. Annual Number of Cases	Annual Rate Infection % 1-4 Age Group
Diarrheas	137,500	0.262
Measles	149,894	0.286
Whooping Cough	87,670	0.167
Pneumonia	61,365	0.117
Malaria	31,558	0.060(1)
TOTALS	467,987	0.892

(1) Population at risk (1-4 age group in malarious areas only) = 130,000. Annual estimated malaria rate for 1-4 years old in these areas is therefore 24 percent.

2. The combined costs of influenza and pneumonia represent 41 percent of the total annual drug costs. Burundi, although located in a tropical area, because of the large proportion of its population living at high

* Population Census Survey, Burundi 1979.

altitudes, (over 60 percent) has a heavy annual cost in the treatment of respiratory diseases. Most of pneumonias in the 0-5 age group however, occur as complications of the acute contagious diseases of childhood, particularly measles and whooping cough.

3. The operating budget for the Ministry of Health for the last three years, (Thousands FBu) is as follows:

1978	1979	1980
360,753	396,503	556,826

In the 1978-1982 Five Year Plan Investment Budget, an additional 121,000 thousand(s) was allocated to health and the national pharmacy to create an additional stock of essential drugs. If this is applied equally over the five year period, it would provide an additional 24,200 thousands FBu for each year. The cost of drugs typically represents about 20 percent of the Ministry of Health's operating budget or about 111,365 thousands FBu in 1980. With the additional 24,200 thousand(s) from the investment budget this would result in an annual drug budget of 135,565 thousand(s) FBu, a figure remarkably close to the estimated annual drug cost for treating the seven common diseases discussed in this section. Additional funds would be needed, of course to treat other conditions. This may prove to be beyond the financial resources of the Government.

The costs of building and operating the extended new rural health infrastructure, proposed by the 1978 Mercenier Health Planning Group are summarized in Annex 30, Exhibit A (Investment Cost) and B (Recurrent Cost). The original investment cost to the GRB of $4.3 million over a period of 13 years is modest but by 1987 annual recurrent cost will become $3.7 million and by 1991, $4.6 million (figures not adjusted for population growth or inflation). Adjustment for these two factors

would at least double these values.

E. Economic Consequences of Demographic Trends

Burundi, like many developing countries, has had difficulties in meeting the goals of its Five Year Plans for Economic and Social Development. A major consideration in the failure to meet these goals has been the high rate of population growth.

The most obvious consequence of uncontrolled population growth is the deteriorating effect it has on the man/land/food ratio. Estimates of population growth vary from 2.0% to 2.7% per year. The census department arrives at a figure of 2.2% from interpolation of data from previous census surveys and the 1979 census count.

The pressure of population on total available land was 154 persons per square kilometer as per the 1979 census. In 1990, when the population is estimated to be more than 5,000,000, the pressure mounts to 191 people per square kilometer. However, when only arable land is considered, the man/land ratio increases from 263 in 1979 to 326 people per square kilometer in 1990.

The man/land ratio is higher for individual provinces even based on available land. In 1979, four provinces had higher densities than the national average of 154 per square kilometer:

PROVINCE	DENSITY PER SQ. Km
1. NGOZI	286
2. BUJUMBURA	251
3. MURAMVYA	246
4. GITEGA	198

Some communes within these provinces have even higher densities:

COMMUNE	PROVINCE	DENSITY PER SQ. Km
Mwumba	Ngozi	373
Kabezi	Bujumbura	428
Kiganda	Muramvya	324
Giheta	Gitega	328

Obviously these densities would be even higher if only arable land is c sidered. At present time only 150,000 hectares of arable land is not under cultivation. This is out of total of 1.4 million hectares of arable land.

There are some indications the food sector of the ratio is alsc deteriorating. Agriculture production during the 1970 - 1977 period barely kept pace with population growth or may have even fallen behind.

The AAO/Burundi CDSS for 1981 indicates that the production of basic fo crops - beans, peas, maize, potatoes, cassava and sweet potatoes - during a six year period, 1970 - 1972 and 1972 - 1977 increased 8.4 to 10.1% while wheat increased 13.7% during the same period. However, population increased more than 14% during this period.

A recent USAID study points out insignificant increases in basic food crops production during a seven year period but indicates a 17% increase in population. Food production per-capita is also declining. According to the same USAID study there was a reported 6% decline in the per-capita output of basic foodstuffs between 1970 & 1979.

The study also suggested considerable post-harvest losses of food occur due to faulty and improper storage facilities.

The adverse land/man/food ratio, caused by a high population growth rate, lower agriculture production and a decrease in per-capita food output, has led to more and more sub-division of farms, increase use of pasture for farm-land, land taken out of fallow or allowed to remain fallow for shorter periods and the use of marginal lands.

The increased population pressure on the land, coupled with traditional inheritance practices, has caused an exodus of farm laborers from the interior to Bujumbura city - where there is an imbalance of males to females - 126 males to 100 females. This exodus of males to Bujumbura has created a reservoir of unemployed & underemployed youths who put additional pressures on social services as well as upsetting traditional mores and social values practiced in the rural areas.

Burundi, as most (of) developing countries, has had a high fertility rate over a long period of time and as a result has a very young population base. Almost 43% of the population is under 15. Consequently Burundi has a very high child dependency ratio. (the proportion of children under 15 to adults in the economically productive ages, 15 to 54).

There is a great difference in the productive age population of Bujumbura compared to the rest of Burundi. The migration of unemployed rugo youths to the capital has created a situation where 57% of the population of Bujumbura is in the productive age versus 49% for the rest of Burundi.

In effect this means, theoretically, 100 persons support 75 people in the non-active group. In the rural areas 100 people in the active group must support 104 in the non-active group. This is not to say that all the so-called active group in Bujumbura is active or that all of the non-active group in the rural area is idle. In industrialized countries 2 to 3 persons in the economically active group supports 1 person in the non-active group.

What can be said is that fertility levels will be the dominant factor in determining the child dependency ratio in the future years. The higher the fertility rate the higher the child dependency ratio and the effect this has in supporting and educating the non-active group.

The higher fertility level will also mean more new workers entering the Bujumbura job market as more and more rural youths are pulled or pushed from an over-burdened rural land base.

The combination of an increased population on a static land base with lowering per-capita food outputs need not necessarily lead to the grim Malthusian spectre of hunger and starvation. As noted in chapter I D, wide spread malnutrition due to food shortages is not evident. At present some protein and calorie deficiencies are noted in the Burundian diet when compared to diets in the developing countries. Seasonal shortages of some foodstuffs occur in some provinces which have shifted to cash crops.

The Burundian farmer grows and consumes most of his basic foodstuff with little if any food being imported. Very little food leaves the average rugo.

At present the farmers produce at a subsistence level and it would appear that increasing crop yields beyond subsistence levels could be obtained through use of organic or green manure, better seeds, better cropping and tillage methods and an extension system that can reach out to the rugo.

Admittedly these inputs would require a restructuring of the present antiquated farming system and major financial inputs but the potential does exist for increasing crop intensity and crop yield. This, coupled with an enlighted population policy, could lead to an improvement of the man/land/food ratio.

The population increase has created an increasing strain on the supply of firewood as more and more of the original forest is cut down for fuel. The use of charcoal, hastens forest depletion. To supply Bujumbura's annual use of 14,000 tons of charcoal requires almost 100,000 tons of wood. Even re-forested areas are being cut back faster than re-planting takes place. Less & less forest means less and less wood as well as leading to severe soil erosion problems.

The goyernment is now seeking investments to develop alternate sources of energy such as peat. Investment in this sector will have to increase to meet demanding fuel requirements for a rapid expanding population.

Another area greatly affected by adverse demographic trends is the provision of necessary services to the people. Chief among these are health and education. An attempt will be made to analyse the increased costs incurred in the provis .on of rural health services as affected by present demographic trends.

In chapter III., it is shown that the heart of the Ministry of Public Health's rural health program is a series of 21 hospitals and 146 existing and 190 planned health centers/dispensaries. The plan is to upgrade 146 existing dispensaries to health centers and to establish 190 new health centers. There is to be one center for each 10,000 population based on the estimated 1978 population of 3,500,000. A factor of 140,000, was subtracted since it represented the population of Bujumbura. This meant a population base of 3,360,000 people and a need for 336 health centers/dispensaries.

The original plan called for 336 centers based on an estimated rural population of 3,360,000 but in actuality the rural population approached 3,800,000. Thus instead of 336 health units 380 were needed so the project began with a shortage of 44 centers.

The construction project was for 10 years and the rate of population growth was not considered. By the end of 1991 the rural population will have increased to 5,040,000. This would mean that by 1991, 504 centers would be needed instead of the original 336 or an additional 168 health units.

The average per-unit cost of constructing a health center was estimated at $16,159 in 1978 constant dollars (see Annex .30). A total of $3,070,210 was planned for this purpose. At constant 1978 dollars the additional centers would require an additional $2,714,712 some 88% more than was originally planned.

The same holds true for the estimated recurrent costs which are outlined in Annex 30. An average of $8,233 was allocated per year per center thus for the 336 health units a grand total of $2,766,288 was allocated. In constant 1978 dollars the estimated recurrent costs for the additional 168 health centers would be $1,383,144 or 50% more than was originally estimated.

Thus, the additional costs involved in constructing and operating the additional 168 units amounts to $4,097,856 due to the original underestimation during the life of the project. No adjustments were made for inflation.

An effort was made to prepare a similar analysis of the primary school program but unfortunately data was not available at the time of writing. Additional studies could be developed for the provision of such services as rural water supply and possibly housing.

III. Burundi Health Sector Organization

A. Policy and Priorities

The government of Burundi's 1978-1982 Five Year Plan for Social and Economic Development proposed a new health development strategy aimed at providing more equitable distribution of essential health services. It criticized the existing system with its over emphasis on curative services concentrated in the more populous areas. It proposed a reform towards a social form of medicine more responsive to the needs of, and more accessible to the people in the rural areas of the interior. It stressed the need for more preventive health programs. In planning and implementing the new strategy, health services would be decentralized and coordinated with other developmental activities under Agriculture, Education, Social and Cultural Affairs and Rural Development Ministries. The health services carried out by the religious missions would be integrated and coordinated with those carried out by the Ministry of Public Health. Greater use would be made of the local administrative units particularly at the commune level.

The plan placed prime emphasis on:

- Strengthening and extending the health infrastructure, including the amelioration and equipping hospitals, health centers and dispensaries and extending population coverage by building new ones, particularly in unserved areas.

- Rationalization of the training and retraining of health workers to better qualify them for community health work, health education of the public.
- Extension and improvement of rural and community water supplies.
- Reduction in communicable diseases, mainly by immunization programs.
- Increasing the supply of, and people's access to, essential drugs.

The plan, therefore, incorporated some of the principles of primary health care with the intent to extend essential health services to rural areas.

The government of Burundi's investment budget to accomplish these objectives through 1982 was 725.2 million FBU broken down as follows:

	Million FBU
Renovation and equipment: hospitals	272.9
Renovation and equipment: dispensaries	124.5
Increased stock of medicine	121.0
Ambulances	30.0
CONSTRUCTION	
8 new health centers (interior)	96.0
4 new health centers (Bujumbura)	52.8
Neuro-psychiatric center	23.0
Blood bank in Bujumbura	5.0
TOTAL	725.2

Additional investment funds expected from foreign donors included:

Hopital at Kamenge	400
Hopital at Kirundo	187
Medical institute and a national health center in Bujumbura	300
TOTAL	887

Of the total government's investment budget of 725.2 million FBU (about 8 million US dollars), 290.5 million FBU (about 3.25 million US dollars), or about 40%, was allocated for peripheral health services. These funds provide for 8 new rural health centers and renovations and equipment of existing dispensaries. Perhaps about one-third of the increased stock of drugs (33% of 121 = 70 million FBU) would be available for rural areas.

The bulk of the investment was for the amelioration of existing, or the construction of new fixed health units. The priority, in terms of funds allocated, continued to be on medical care at fixed health units, i.e. infrastructure development. This may, of course, stem from a perceived need to strengthen and expand the health facility's infrastructure before outreach services can be extended to the periphery, However, there is no clear policy or planned action to support such a hypothesis.

B. Central Government Organization

Burundi is a one Party Republic with the following organizational structure:

1. National

a. A President of the Republic

b. A Secretary General of the Party (Union for National Progress - UPRONA)

c. The Political Bureau (8 members)

d. The General Committee of the Party (48 members)

e. Seventeen Ministries:

- Foreign Affairs and Cooperation
- Agriculture
- Finance
- Interior
- Commerce and Industry
- Justice
- Transport and Aeronautics
- Education
- Public Health
- Public Works, Equipment and Housing
- Geology and Mines
- Post and Telecommunications
- Social Affairs and Labor
- Information
- Youth, Sports and Culture
- Plan

- Public Function

2. Provincial

The Territory of Burundi is divided into 8 provinces: Bubanza, Bujumbura, Bururi, Gitega, Muramvya, Muyinga, Ngozi and Ruyigi. Each province has a governor. The provinces are divided into 18 districts (arrondissements), the districts into 79 counties (communes), and the counties into 2,460 hills (collines).

The colline is the basic socio-geographic unit of local community. In general, all Burundians are identified with a colline. Villages in the usual sense do not exist.

C. Ministry of Public Health Organization

1. General

The Ministry of Health at the national level in Bujumbura is a highly centralized organization with overall planning and operational responsibility concentrated in the office of the director general. (See organigram on the following page.) Execution of the country's health services is through four medical regions, each under a doctor as regional medical chief. Each medical region is divided into sectors headed by a doctor chief of sector. There is a rural hospital in each of the 21 sectors. The sectors are in turn divided into a varying number of subsectors based on a service area of approximately 10,000 population each. Since there is an average of about 50,000 people in a commune, it follows that each commune would have several health subsectors.

The services under the director general at the national level and those under the medical chief at the regional level are administered through three departments:

a. The Department of Epidemiology, Hygiene and Laboratories

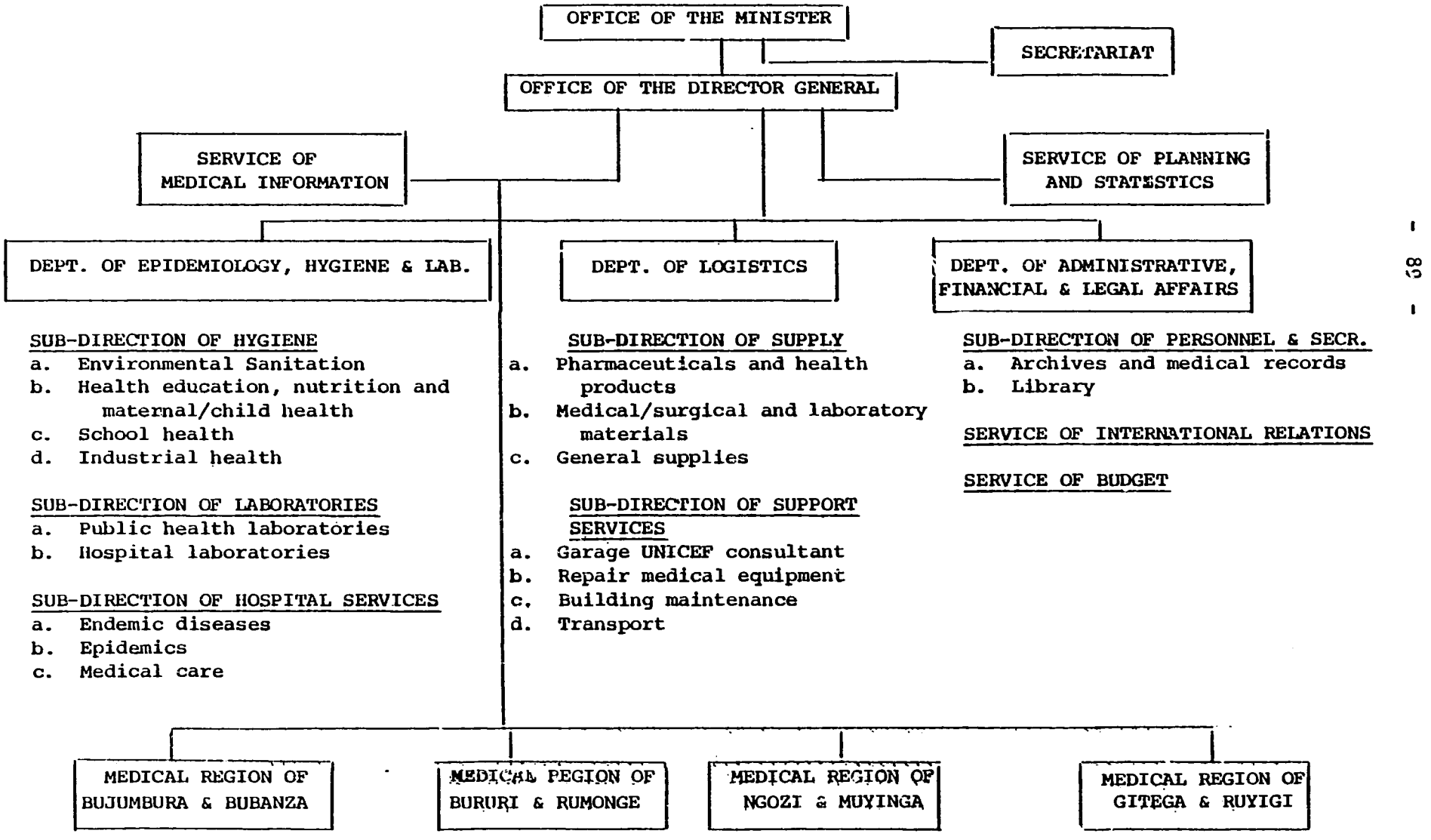
b. The Department of Logistics, and

c. The Department of Administration and Finance.

There is a director for each department at the national level. At regional levels, although the organization pattern is essentially the same, it is more stream lined. The secretariat of the regional medical chief, for example, ordinarily compiles the statistical information and the department of logistics at the regional level in reality functions primarily as a medical supply unit.

ORGANIZATION OF THE MINISTRY OF PUBLIC HEALTH

GOVERNMENT OF BURUNDI



2. The Department of Epidemiology, Hygiene and Laboratories

This department administers a rather loose assembly of services which are not necessarily related to each other nor to other similar nation-wide technical services. The subdirection of hygiene for example is mostly occupied with routine sanitary improvements for the City of Bujumbura. The Belgian assistance through Fonds Medical Tropical (FOMETRO), has been operating mobile public health teams in support of several village dispensaries to the north in the Ruzizi Valley. This activity will be replaced by the new studies of malaria and schistosomiasis that start in 1981.

The public health laboratory is only rudimentary and does a small volume of work. It has limited capacity. A better equiped and well staffed public laboratory called the National Biological Laboratory operates with French technical assistance within FOREAMI (Fonds de la Reine Elisabeth pour l'Assistance Medicale et Indigene) adjacent to the Prince Regent Charles Hospital in Bujumbura. Foreami is a special unit for maternal and child health services for a section of the Bujumbura population. It has no clear relationship or coordination with the small inactive sections of health education or the laboratory services carried out in the Department of Epidemiology, Hygiene and Laboratories.

It is evident therefore that the functions and organization structure of this department needs to be redefined. This is

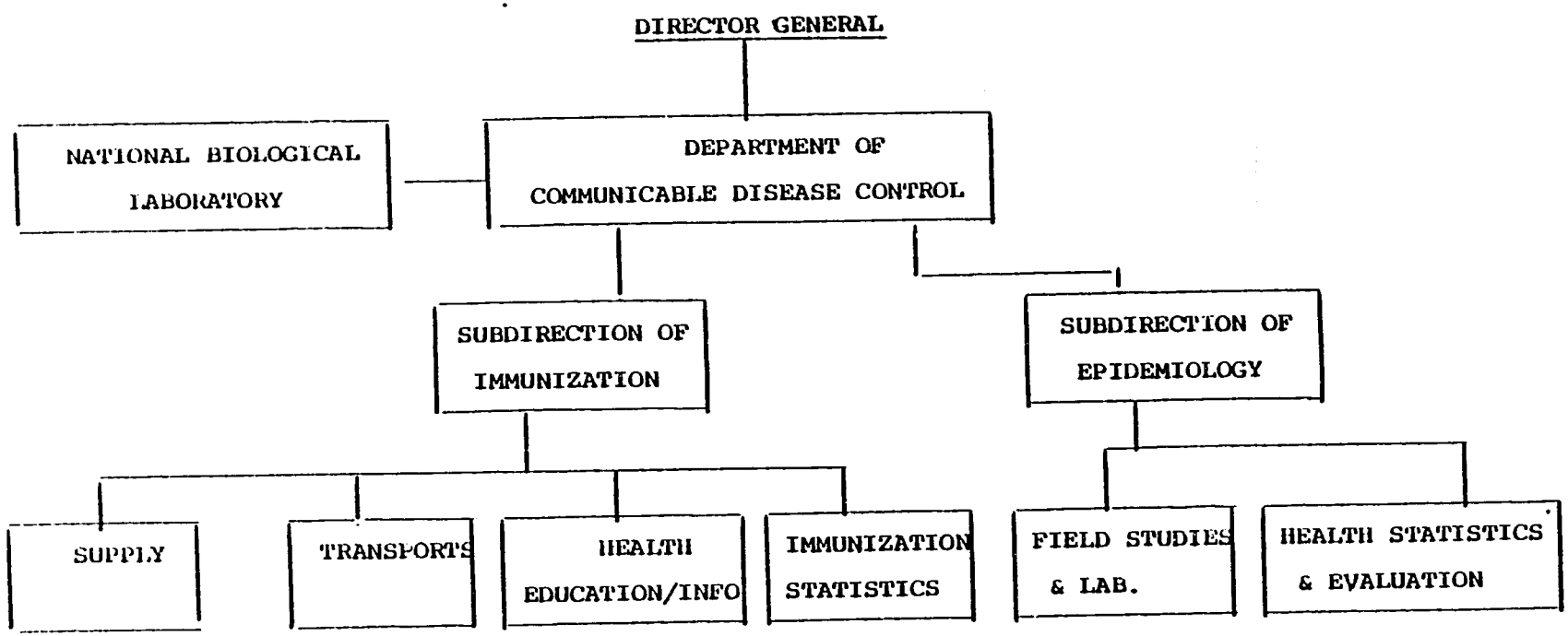
particularly important because the development and extension of the immunization program under the Programme Elargi des Vaccinations (PEV) will be implemented under this department.

Another important role of the department is the collection of epidemiological data. This stems almost entirely from reports from the fixed health units on reportable diseases. These units cover only about 10% - 20% of the population in rural areas. There is serious underreporting and no valid information on the true prevalence of these diseases. Since base data is not available, it will be very difficult to evaluate progress made in controlling communicable diseases.

A reorganization of this department into a structure more responsive to its functions could be accomplished along the lines of the organigram on the next page.

3. Department of Administrative and Financial Affairs

This department contains the conventional services of personnel, correspondence (secretariat) and the service of budget as well as the less commonly found services of international relationship, library and medical records. It is a weak department and does not play an important role in planning and operations. Similarly, the service of planning and statistics, shown on the organigram in a staff role under the director general, has little function or capability. These fragmented statistical and planning services should be all incorporated into one viable strong department for administration and management planning. Considerable training and perhaps a long term expatriate planning consultant would be needed to strengthen such a unit. Regardless of its position or


DIRECTOR GENERAL
NATIONAL BIOLOGICAL LABORATORY
DEPARTMENT OF COMMUNICABLE DISEASE CONTROL
SUBDIRECTION OF IMMUNIZATION
SUBDIRECTION OF EPIDEMIOLOGY
SUPPLY
TRANSPORTS
HEALTH EDUCATION/INFO
IMMUNIZATION STATISTICS
FIELD STUDIES & LAB.
HEALTH STATISTICS & EVALUATION

composition it should have a close working collaborative relationship and frequent liaison with the Ministry of Plan and within the Ministry of Health, with the Department of Epidemiology.

4. The Department of Logistics

The Department of Logistics has a logical organization structure consistent with its functions. It contains two sub-directions: supply and support services (Services Techniques). Each of these sub-directions warrants a detailed description.

Supply

There are three services under supply:

a) Pharmaceuticals,

b) Medical/surgical and laboratory materials and equipment, and

c) General supplies.

The pharmaceutical supply service is the largest, the most active and the best organized. There is a bulk storage warehouse and a large, central pharmaceutical storeroom where working stock is maintained and quarterly issues are made to the four medical regions. From regional medical warehouses, distribution is made to health sectors and hence to the peripheral health units.

The central pharmaceutical storeroom is spacious, clean, dry, well lighted and ventilated. Pharmaceutical supplies are stored on shelves in an orderly way and grouped alphabetically by

therapeutic usage, e.g. analgesics, antibiotics, etc. The working stock is easily identified by appropriate signs on the shelving sections. All drugs have a stock number, with a corresponding stock card which contains standard heading information, i.e. stock number, name of drug, unit of measure, maximum and minimum stock level and unit price. The body of the card has columns for date, issue or reception, document identification, origin, amount entered, amount issued and stock balance.

Physical inventories at the end of the calendar year are recorded directly on the stock card on the appropriate date line in red ink. The system is well set up and, in general, well carried out. The same system for stock records and storage is maintained at regional and sector supply units. It is well understood and well standardized.

The list of drugs stocked are classified into 3 groups: A, B and C, corresponding to their decreasing importance. List A contains 166 items of which approximately 100 items are pharmaceuticals, the other items include: vaccines, dental supplies, dressings, intra-venous fluids, anaesthetics and X-ray supplies. The drug selection resulted from the recommendations of an in-country drug committee, representative of the Ministry of Health, missions and consultants familiar with health care needs and practices in Burundi. It is a good list, relatively short, yet the 100 pharmaceutical items on the A list, if adequately supplied, would provide suitable treatment for over 95% of the ailments found in Burundi.

The group B list contains 46 additional pharmaceutical items that, although not commonly needed for general outpatient clinics, are important in the treatment of special cases, e.g.: anti-tetanus and anti-diptheria serums, vitamins A, B and K, morphine, flagyl, and nystatine preparations for gynecological infections, etc.

Group C contains 27 additional items less commonly used, including such items as: griseofulvin (for systemic fungus infections) and less used antibiotics such as erythromycin, vibromycin, etc.

There is an established most essential drug list which has the highest priority in supplying dispensaries and health centers. The information about these most important drugs is summarized in the table below:

SEVEN MOST ESSENTIAL DRUGS

DRUG	UNIT	PRICE IN FBU	QUAN. NEEDED TO TREAT ONE CASE	ONE CASE TREATMENT COST		PLANNED PRODUC 1981, ONAPHA (IN 1,000 UNIT
				FBU	US$	
ASPIRIN	500 mg tab	0.945	10	10	0.11	9,000
CHLORAMPHENICOL	250 mg cap	6.312	20	126.2	1.41	1,750
TETRACYCLINE	250 mg cap	4.598	20	91.96	1.03	1,750
CHLOROQUINE	100 mg cap	1.883	30	56.49	0.63	9,000
COUGH MIXTURE (SYRUP PECTORAL)	100 ml	50	1	50.00	0.56	200
VERMOX (MEBENDAZOLE)	100 mg tab	3,519	6	21.11	0.24	6,000
ORAL REHYDRATION POWDER	27.56 gm in plastic sack	33	1	33	0.36	73

Stocks of these drugs, which are all produced in-country, are adequate for present usage rates except possibly for oral rehydration powder. However, there are often temporary shortages at peripheral health units due to lack of proper budgeting, lack of planning and delays in distribution.

The requisition system is standardized. Requisitions are made quarterly. The list of drugs available for regular issue (i.e. List A) is preprinted in a column on the left and there are columns for amount on hand, amount requisitioned, amount received with dates. Requisition/issue forms are available at all the health units and, in general, are well kept. Often the regional or sectoral medical supply unit does not receive all the items nor the full quantity requested. This is sometimes due to requests for excessive quantities. Often too, because of regional shortages, requisitions are reviewed at national, regional and sector levels and best judgement adjustments in quantity, substitutions or deletions are made.

The quantities of drugs produced and stocked are not yet adequate to meet all essential needs and the stock in distribution is skewed due to long standing shortages. With increased in-country production and recently more adequate budgeting, these difficulties should be minimized. The ultimate problem will be excessive cost, if the essential drug needs for treating common illnesses are fully met on an equitable basis. The analysis in the section "Economic Cost of Poor Health" of this report estimates an annual recurrent drug cost of about 1.5 million dollars to treat

the nine most common illnesses. However, a concurrent extension of preventive health services particularly immunizations and health education would substantially reduce this burden.

The National Pharmaceutical Office (ONAPHA)

This parastatical drug production unit is located on the Boulevard Premier Novembre in Bujumbura, adjacent to the UNICEF garage (which will be discussed later). At the time of the team's visit, it was undergoing renovations and extensions, and production was temporarily suspended. This did not substantially interfere with an assessment of its existing organization and capability, or a review of its plans for expansion.

The existing facilities include:

a. A quality control laboratory with all the essential, modern, scientific equipment to perform the needed physical and chemical tests of crude and finished products.

b. A tablet production line, including the mixers, dryers, tablet moulders, etc., necessary to turn out hundreds of thousands of tablets a day.

c. A capsule production line with a smaller output capability.

d. Solutions and syrups production/bottling line for semi-mass production, e.g. cough mixtures are produced and sold wholesale in plastic containers (like jerry cans) of 25 liter capacity.

e. A not too well developed line for the production and packaging of powders in individual plastic sacks (mainly for rehydration powder).

The new planned expansion with work under way will add:

a. A line for ampule production.

b. A line for producing physiological parenteral (isotonic saline solutions for IV, etc.).

Although the government has a first priority on ONAPHA's output, there is a commercial section. The price of drugs sold to licensed private pharmacies, missions, etc. is standardized and is the same as that paid by the Ministry of Public Health. Except for those in Bujumbura, there are only three licensed private pharmacies in Burundi. These are located in Gitega, Ngozi and Rumonge. The people's accessibility to essential medications through the private sector is very limited. The price of drugs at private pharmacies also is high for some, reasonable for others, as shown in the following comparison table for the seven most essential drugs.

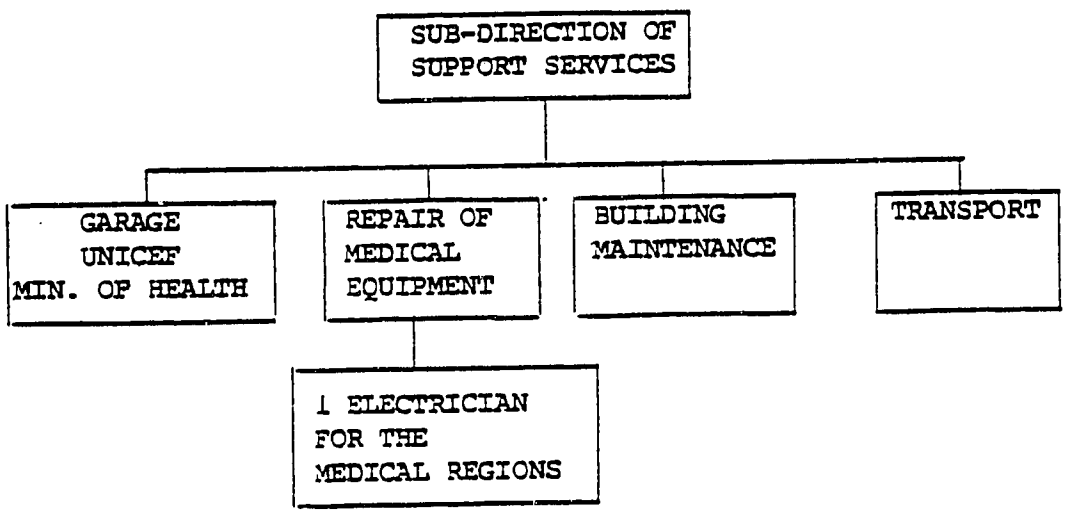
DRUG	DRUG PRICE ONE CASE TREATMENT (FBU)	
	PRICE AT ONAPHA	AT PRIVATE PHARM.
ASPIRIN, 500 mg	10	23
CHLORAMPHENICOL, 250 mg	126.2	135
TETRACYCLINE, 250 mg	92	161
CHLOROQUINE, 100 mg	56.5	202.5
COUGH MIXTURE SYRUP PECT.	50	240
VERMOX (MEBENDAZOLE), 100 mg	21	360
REHYDRATION POWDER	33	NOT AVAILABLE

Belgium has assisted ONAPHA with technical assistance and equipment.

ONAPHA's most serious unmet needs are: more crude chemicals (ingredients) and testing reagents, a more efficient machine for heat sealing plastic sacks (important for the production of rehydration powder units) and a new,more efficiant label printing machine. The biggest impediment to reaching and maintaining full-scale production will be, of course, the cost of the raw ingredients.

The Sub-direction of Support Services (Services Techniques)

The current operational structure of this major unit of the Ministry of Health can be diagrammed as follows:



The repair and maintenance shops are on the grounds of the Ministry of Health; the garage for maintenance and repair of vehicles is located next to ONAPHA on Bld. Premier Novembre in Bujumbura.

The buildings and maintenance section includes a carpenter shop, plumbing section and electrical section. These shops are well equiped with essential hand and power tools including a lathe for making machine parts. There is a log jam of broken down general type utility items, many of them awaiting replacement parts. With various makes of equipment from different countries and long shipping time, there is always a downtime on equipment repairs; often 6 months or longer.

These repair/maintenance shops backstop all the government hospitals and other health facilities throughout the country. It is obvious that this one repair facility cannot keep up with the work load. Under the new regionalization policy, there are plans to create regional service shops. Hospitals have their own maintenance crews but cannot do the more complicated repairs.

The major peripheral units (hospitals at regional and sector levels) all have telephones and the doctors can call the chief of support services in Bujumbura directly from around the country. The chief personally screens all these calls and tries to assign them priorities according to needs and urgency. This results in a nearly continuous flow of calls and interruptions.

One expatriate technician and a small trained Burundian staff work in the specialized shop for the repair of medical equipment. They must do the repairs on such diverse equipment as X-ray and electrocardiographic machines, anaesthesia, suction apparatus, sterilizers, surgical lamps, etc., that are acquired from a variety of sources and countries. Often operational and repair manuals are not available in country and usually there is no manufacturer's representative in Burundi. The situation, fortunately, is better for X-ray equipment; most of it is in French and fairly well standardized. One electrician medical repair technician is employed nearly fulltime for repairs in the interior.

In general, although the maintenance and repair services are reasonably well equipped, it is understaffed for its work load. The main cause of delays, however, is the long turnaround time for procurement of spare parts. Standardization of equipment would help as would decentralization of repair facilities. The missions ordinarily take care of their own maintenance and repair needs.

Garage

Although the Ministry of Health has had its own automotive maintenance shop since 1976, the existing garage opened in its present location adjacent to ONAPHA in May, 1980. UNICEF furnishes a full time technical collaborator who has reorganized the section, helped train the staff and set up operational procedures. The Burundian staff of 32 include; 1 garage chief, 20

mechanics (including one chief mechanic), 1 secretary, 2 storekeepers, 2 drivers and 6 watchmen.

The mechanics are organized into specialized teams (although all teams do other repairs when their special skill is not required). These teams are: team 1 - breakdowns, gear box and differentials; team 2 - clutch and breaks; team 3 - engine overall; team 4 - general maintenance and lubrication; team 5 - body work and painting; team 6 - electrical (one worker only); team 7 - tires (one worker only). Each of the storekeepers manages a storeroom, one for tools and lubricants, the other for spare parts.

The garage does repairs for Ministry of Health vehicles which total at present 62 (about 55 - 60 effective at one time), for ONAPHA that has 5 vehicles, for about 15 vehicles that UNICEF has furnished to the Bureau of Rural Education and 3 vehicles for the UNICEF supported Rural Water (capped springs) Project. Therefore, the total fleet serviced is about 85. Work on Ministry of Health vehicles is done without charge; ONAPHA, the Bureau of Education and the Water Development Project however, must furnish spare parts and pay for the labor.

The vehicles serviced have four countries of origin: Germany, England, France and Japan and comprise twelve to fifteen models. Brand names are mainly Volkswagen, Landrover, Peugeot, Renault and Nissan (ambulances and trucks). Landrovers are being phased out and replaced mostly with VW combis. In addition to

the above serviceable vehicles, an additional 37 old vehicles (6 to 11 years old) were surveyed in 1980 and turned over to the Ministry of Health; most of these are still in the garage yard but are gradually being sold off.

The Ministry of Health has 47 drivers, with 62 vehicles of which 55 - 60 are effective at any one time. There are more vehicles than drivers. Some are, therefore, self-driven. Control of vehicles in the Ministry of Health is by a daily check list of vehicle trips. Every government vehicle on the road must have an "Ordre de Mission" kept by the driver for each trip with origin, destination and kilometers recorded. This corresponds roughly to a trip ticket system commonly used for vehicle control in American managed fleets. The police regularly stop government vehicles to check for "Ordre de Missions". Drivers and vehicles without them are turned in.

Each vehicle that comes to the garage has a "fiche de travail" (work record card) on which maintenance and repairs are recorded. This provides a history of repairs and maintenance for each serviced vehicle. Tools are controlled by a system of perforated, numbered, metal tags. Each mechanic receives ten tags when he comes to work. Tools are stored on wall hooks with a pattern outline for each tool. The mechanic gives the storekeeper a tag and receives the tool requested. His numbered tag is then hung on the hook specific for the tool received. He returns the tool in exchange for the tag. The mechanic must pay replacement cost for any tool not returned.

There are two training courses each year for drivers and two courses for mechanics. The first course for drivers (47 trained) was in October, 1980 and will be repeated in June, 1981. Subjects taught include safe and proper driving, preventive maintenance, basic understanding of automotive mechanics, recognition of major parts and their function, trouble shooting and minor emergency repairs. A third course for drivers is scheduled for December, 1981. The first course for mechanics will be given in March, 1981; the second course in September, 1981.

In general, the garage is well organized and well managed. There are several persistent problems, which are:

a. Long delays in procuring replacement spare parts,

b. Recurrent shortages of proper size tires in the local market,

c. Shortages of miscellaneous small materials and slow, cumbersome purchasing procedures through the Ministry of Health and the Finance Office.

UNICEF provides the customary 10% of value in spare parts for UNICEF furnished vehicles and also provides other spare parts as needed through UNICEF procurement procedures. This is not generally true for vehicles furnished from other sources. With the variety of vehicles (12 - 15 different models) and the unlikelihood of finding spare parts on the local market, vehicles are often dead-lined for 6 months or more awaiting spare parts. The same is true for tires.

A particularly annoying problem is the lack of stockage of minor materials such as: emory paper, adhesives, gaskets, primer, solder paint, etc. There are no funds for prior purchase and stockage of these items. Local purchases are made ad hoc. There is no petty cash fund. Stocks of these items are unpredictable in Bujumbura. Often when funds are made available, through the government's cumbersome system for authorizing funds, the materials needed are not available locally for purchases. This could be solved by instituting a petty cash fund of about 50,000 FBU per month for these small purchases.

5. Resources

a. Manpower

The major kinds of health personnel working in Burundi are doctors, medical technicians, registered nurses, auxiliary nurses, sanitary technicians and sanitary assistants. There are also some dentists, pharmacists and a laboratory technician. In addition, there are vaccinators which are assigned to the dispensaries and health centers in the medical sector of Muramvya, which is the pilot zone for the expanded vaccination program.

The goal is to have each rural hospital staffed with:

2.25 doctors
- 3 medical technicians
- 12 nurses
- 1 sanitary technician
- 1 administrator

The Prince Regent Charles Hospital and Prince Luis Rwagasore Clinic in Bujumbura are larger and more comprehensive facilities, and thus have larger personnel needs. There are also doctors assigned to various services in the Ministry of Public Health such as the Department of Epidemiology.

The goal for the rural dispensaries and health centers is:

- 1 medical technician
- 1 auxiliary nurse
- 1 sanitary assistant

And at the present time, there are two vaccinators per dispensary/ health center in the Muramvya pilot zone for the vaccination program.

According to the WHO Profile, in 1980, there were 119 doctors in Burundi. Sixty-two of these were Burundian nationals and fifty-seven were expatriates. Eighty-two were posted to Bujumbura and thirty-seven to other areas in the country. There were also:

- 590 medical technicians and registered nurses
- 465 auxiliary nurses
- 10 sanitary technicians
- 87 sanitary assistants.

Dentists total 4, 2 Burundians and 2 expatriates. Three of the four are in Bujumbura. There is one Burundian laboratory technician in Bujumbura. Pharmacists number 17, 9 of which are Burundian with 8 expatriates. Only one of these is found outside Bujumbura.

Foreign health personnel are largely from Belgium, France, Russia, Cuba and Denmark. In addition to this expatriate personnel which is integrated into the regular government services, there are a number of religious missions. representing different countries which have health facilities. They have personnnel from their respective countries in addition to their Burundian staff.

The number of health personnel equal:

- 1 doctor/ 33,798 population
- 1 medical technician or nurse auxiliary/6,817 population
- 1 auxiliary nurse/8,649 population.

Over 2/3 of the doctors are in Bujumbura which has only 5% of the population.

To fulfill manpower needs, the GRB's objective is to train yearly:

- 25 medical technicians
- 40 registered nurses
- 7 sanitary technicians
- 45 auxiliary nurses
- 20 sanitary assistants

b. Facilities and Equipment

Burundi's health infrastructure is composed essentially of hospitals, dispensaries and health centers. Health centers are like dispensaries except that health centers also have some beds.

The GRB is planning to upgrade all dispensaries to health centers by the year 1987. In addition to the hospitals, health centers and dispensaries, there is one sanitarium for the treatment of tuberculosis, a leprosarium and a number of maternities.

The French Medical Mission has been running the GRB's Center for the Fight against Sleeping Sickness at Kimazi, which includes a mobile unit. The center is now focusing on other major endemic diseases, as sleeping sickness no longer constitutes much of a problem. The most notable problem under consideration at the present is tuberculosis. The Belgians have mobile teams for vaccinating school children in Bujumbura and on the plain. They are vaccinating against smallpox, tuberculosis and tetanus.

According to the WHO Profile, in 1979 there were 13 hospitals in Burundi. Ten of these were government facilities and 3 were private, private essentially being those facilities being run by religious missions. Two of the 13 hospitals were in Bujumbura. The number of hospitals now stands at 23, 21 in the rural areas and two in Bujumbura. In 1979, the number of health centers and dispensaries stood at 154, 89 government and 65 private. Sixteen were in Bujumbura and 138 in the rural areas. The number of this type of facility has increased to 161. In 1979, also, there were 21 maternities, 9 being government facilities and 21 private. All but 2 were outside Bujumbura. The tuberculosis sanitarium is located in Kibumbu.

The importance of the role of the missions in delivering

medical care must be remembered as they run over 40% of the dispensaries and health centers, and over 50% of the maternities. They make a significant qualitative contribution as well, which is discussed in Chapter IV.

Using the WHO statistics, in 1979 there was:

- 1 hospital/ 174,866 population
- 1 health center or dispensary/ 24,981 population
- 1 bed/ 1264 population.

In speaking about facilities and equipment, the Five Year Plan, 1978 - 1982 states the goal of equipping the hospitals so that they can adequately meet their needs. It also speaks of plans to convert the hospital at Rwibaga into a neuro-psychiatric unit. Other plans include extension of the blood transfusion service, completing equipment for the pharmaceutical laboratory and having the transport necessary to carry out services and activities, meaning vehicles and ambulance. The objective of obtaining equipment and vehicles is reflected in the emphasis on these materials in the various projects being signed by the GRB.

A problem with equipment is often not that it does not exist, but that it is not maintained. This can be a lack of adequate personnel with know-how about the necessary maintenance and repairs, and even when the personnel exists, frequently there is a lack of spare parts.

D. Health Service System Performance Record

The Five Year Plan 1978 - 1982 emphasizes development of programs for the rural community, the need for decentralization of health services delivery, and a turn towards preventive health care. As stated in Section A of this chapter, the GRB sees important areas to be worked on as the health infrastructure, training and retraining of health workers with special emphasis on health education, rural and community water supplies, an immunization program, and access to essential drugs.

The allocation of the national budget to health has remained fairly constant and was about 5.5% in 1980. As illustrated in Section A, the major priority in use of the health budget's funds was for medical care at fixed health units.

At the present time, the fixed health units are failing to reach a large percentage of the rural population. An important factor in determining usage of a health facility, is the distance a person has to travel in order to get there. Those people living within 5 Km. of a health facility are quite likely to use it; those within 10 Km. less likely and within 15 Km. not likely at all. People are more likely to travel greater distances to a facility if they feel a service is going to be provided once they arrive. For this reason, mission facilities are usually serving a greater number of people than the government facilities. There is little outreach going on from the fixed health facilities in order to reach more of the rural population. Outreach is more likely to happen from the mission centers.

The enlarged vaccination program addresses itself to the government priority of cutting down on communicable diseases through immunizations. Outreach is a component of this program, both through mobile units and use of the party cell-leaders to mobilize their respective populations, so that the mothers bring their children on the appointed days. The outreach has broken down both in the mobilization of the population to attend the vaccination sessions, and in the mobile units going out as much as they are supposed to. They do not always come back at the proper time to do the follow-up vaccinations in a vaccination series. So, planned outreach is not functioning in the manner in which it should to assure a service to the rural population.

Health care services are still more curative than preventive. Health education is talked about as part of the program, but exists more frequently in theory than in practice. This is because a staff does not exist that has been adequately trained in preventive medicine and health education, and there is a lack of a firm policy and program for health education in the health centers. Personnel training needs a strong emphasis on and practice in preventive medicine. The lack of a regular program of recyclage adds to the problem, as skills must be updated in order to put into practice the new philosophy. The Department of Social Affairs is doing preventive medicine in areas of nutrition

and health education. Preventive medicine in the health centers would be strengthened by a close collaboration with the personnel of the "foyers sociaux", but presently this is happening only minimally, although in theory it is supposed to be taking place.

An area of the rural milieu where community organization has been successfully done is the UNICEF sponsored capping of springs which is discussed in Chapter IV, B., 3. The population is out there doing the necessary labor. The simplicity of the organization of the program has aided in its successes.

Another example of an organizationally simple project that is working, is the work of the sister in Gitega discussed in Chapter IV, A, who is doing leprosy treatment. She has integrated herself well into the existing health infrastructure and it is a service that is reaching the rural population. Although she is limited to fixed sites, she has increased the population served through her mobility. The program succeeds because she has organized herself well; has trained the in-place staff as to how to help diagnose new cases on the days she is not at their specific center; and the services are well-planned, simple and direct.

The laboratories at the rural hospitals are not highly equipped, but they are performing the basic tests appropriate for much of what is routinely cared for at a rural level hospital.

A factor that is contributing to the difficulty in translating government health policy into effective action is the emphasis on needed materials without the formation of concrete plans for the actual implementation of the programs. This is reflected in many of the projects signed with various agencies. The UNFPA/MCH project,for example, has a large component for the donation of equipment. The PNUD sewer project signed in 1975 has a well-equipped office, but has run out of funds so it cannot implement the project at the present time.

The GRB's plan to decentralize health services in order to improve delivery to the rural areas is not a true decentralization. Even though there are four medical regions, the power for programming still lies essentially at the central level. Also logistical support, as maintenance, is centered in Bujumbura. Even drugs are stored at the national level, and are distributed only quarterly to the regions.

The problem with the organization of the Ministry of Health are discussed in Section C of this chapter. This change to preventive medicine is hampered by the neglect of the sub-department of hygiene with its potpourri of sections: nutrition and health education; sanitation, school and work hygiene. There are areas that must be strongly supported to have a strong program in preventive medicine.

The performance of the Ministry of Public Health in the areas of logistical support, medications, and equipment maintenance are discussed in detail in Section C.

IV. Major Burundi Health Programs

A. Sectoral

1. Basic Rural Health Services Development/MCH

The Five Year Plan, 1978 - 1982, gives a great priority to developing programs to aid the rural population. Among this is improving access to health services for those in rural areas. One part of this is through decentralization of the health delivery system and improvements in the infrastructure. The Party, as well, should play a role in mobilizing the masses to improve their development status.

With the decentralization of the health service delivery system, Burundi has been divided into four medical regions: Bujumbura, Bururi, Gitega and Ngozi. Each region is responsible for administering the medical facilities within it. The medical region of Bujumbura is composed of the provinces of Muramvya, Bubanza and Bujumbura; Bururi of the province of Bururi and the "arrondissement" of Rutana (in the province of Ruyigi); Gitega of the provinces of Gitega and Ruyigi (except for the "arrondissement" of Rutana); and Ngozi of the provinces of Muyinga and Ngozi. Each region is administered by a head doctor and an administrative head. The regions are broken down further into medical sectors. Each sector also has a head doctor and an administrator. The sectors are broken down further into medical formations, each formation being composed of a hospital and the dispensaries in the area of the hospital. The formation is headed by the doctor or head doctor of the hospital.

There should be a dispensary or a health center within 15 kilometers of each member of the population. This average can present a problem, however, as the population density is not the same throughout the country, so that some dispensaries may be overloaded while others are underutilised.

Outreach can be done through the local political system. There is a political leader for each 10 rugos which comprise a cell. Ten cells make up one zone. There are then various numbers of zones which comprise a commune. If someone from a medical center wants the community to participate in a program, he can go to the head of the commune, who will then call a meeting of the zone leaders. Each zone leader can then meet with his cell leaders, who will then organize the participation of those people who live in the rugos within his cell. An example is the vaccination program where each colline has an assigned day for vaccination. A colline may be equal to a cell, or a colline may be comprise of more than one cell. But it is up to the cell leader to see that the mothers in his cell show up on the proper day.

There are vehicles available at the sector level to help extend services. However, mobile units have been cut back as they are too expensive.

The new emphasis of the rural health program, per the GRB's objectives, is to turn away from the curative and towards the preventive side of medicine. One aspect of this is MCH services. There are not separate MCH centers. MCH activities

are integrated into the regular activities of dispensaries and health centers. There are special times set aside for activities such as prenatal examinations, infant consultations, vaccinations and well-baby clinics. Some of these rural centers also have a maternity. However, most women choosing to deliver there come because they have a problem pregnancy and a potentially difficult delivery, or are in fact having a difficult delivery. Most deliveries take place at home, on the colline, attended by a traditional mid-wife, or in some cases by a female relative.

An important aspect of the emphasis on preventive medicine is health education. In theory, this should be integrated into the various aspects of the rural health dispensary or health center's daily services. This is especially true of the MCH activities, and according to the prescribed program there is health education taking place at the time of prenatal consultations, vaccination visits and well-baby clinics. Health personnel should also be getting out to the collines for health education through home visits.

The "foyers sociaux" of the Department of Social Affairs are an important part of the health education aspect of rural health services, especially as it relates to MCH. They are doing nutrition education and demonstrations, as well as health education in other areas that relate to the well-being of the family, such as environmental and personal hygiene. Also it is their personnel that are actually doing home visits to any degree,

although they are limited to areas within five kilometers of the "foyers sociaux" as they must go by foot. This is further complicated by the fact that the "monitrices" cannot spend the night with someone on the collines and therefore must travel the distance both coming and going in one day. The activities of the personnel of the Department of Social Affairs should be done in close collaboration with the facilities and personnel of the Ministry of Health. However, at the present time, this integration does not exist to any great extent, and if it does exist, it is usually in the hospitals.

The health facilities run by the various religious missions make up a large percentage of the total facilities in Burundi. They are integrated into the GRB system. However, they also have other resources, so are better equipped with supplies and medications. With these extra supplies and medications, plus often a better organization of programs, the missions are usually able to provide more and better services, including in the area of health education. Much of the population is likely to be more responsive to facilities which offer better services. Thus, the missions play an important role in rural health services.

There is a Spanish sister doing a leprosy program in the region of Gitega. The various dispensaries and health centers have an assigned day each month for her visit. She has a health education topic and presentation for the patients each month.

The curative part of the program consists of three phases: treatment, maintenance and then "cured". When a patient is cured, he is given a card to that effect.

The GRB, in January 1981, signed a MCH project with UNFPA. The project also contains a large family planning component. This project seeks to integrate curative and preventive services in the rural milieu. This is right in line with the goals stated by the GRB in its Five Year Plan 1978 - 1982. The family planning aspect will be discussed in part 3 of this section. The project wants to systemize MCH activities, as well as education, in the areas of environment and personal hygiene, fighting communicable disease and nutrition education. There is special attention to prenatal care and delivery, as a significant incidence of pregnancy and delivery complications exists. Realization of the project goals is to be obtained by developing an appropriate infrastructure at all levels of the administrative structure. This includes creating a subdivision for MCH and family planning under the Department of Epidemiology and Laboratories. There will be training and "recyclages" for medical and paramedical personnel and for relevant personnel of other ministries that deal with social matters. The inclusion of the other personnel is part of the objective to make this an integrated program. Special attention will be given to the personnel of the "foyers sociaux". Preventive activities and health education will be organized in the rural

milieu, and material and logistical support will be given. Material support includes those things needed for production of health education materials, as well as office materials, vehicles and refrigerators. Long term evaluation will be by whether or not there is a drop in the maternal and child morbidity and mortality rates.

WHO also wants to propose a project in the area of health care coverage. It seeks to extend primary care coverage so that no geographical area is neglected. It would also be involved in training and production of personnel. It contains a component to study the feasibility of community health agencies and committees. WHO is in the process of seeking funding for implementation of this proposal.

USAID's CDSS includes an interest in improving delivery of health and family planning services; with a particular interest in integrated programs.

2. Communicable Disease Control/Expanded Immunization

The GRB's expanded immunization program after a planning period of about 16 months, began in September, 1980. The long term objective of the program is:

To establish and maintain a country-wide program of immunization, with coverage as complete as possible, against the six important infectious diseases: measles, whooping cough, tuberculosis, diptheria, poliomyelitis and tetanus.

The shorter term objectives are:

a) To immunize, by 1985, 70% of infants 0 - 24 months against measles and tuberculosis and 60% against diptheria, tetanus, whooping cough and poliomyelitis.

b) To sensitize health staff to the advantages of preventive medicine by participating fully in an immunization program.

c) To improve the collection of data necessary to evaluate the program.

d) To teach the people the advantages of immunization services to obtain their better participation.

This is the government's largest undertaking in personal preventive health services. In operational terms, it includes:

a) The establishment of a central and peripheral immunization infrastructure.

b) The retraining of over 300 middle and peripheral level health workers.

c) A revision and standardization of the communicable disease reporting system.

d) A health education/information program country-wide.

e) A supply maintenance and transport system (including an efficient cold chain) eventually down to some 200 health units.

The programs's original terms of reference were developed in May, 1979 with the help of Dr. Zia Islam, the regional WHO Representative from Nairobi. Subsequently a working group of nine (6 from

the Ministry of Health, 3 from WHO) developed the document titled the Programme Elargi de Vaccinations late in 1979, which is the basic working plan for the program.

A phased implementation was adopted which started with a pilot sector (Muramvya) in September, 1980 to test methods. While the trials were being carried out in the Muramvya sector, preparatory work (strengthening the reporting systems, orientation of health workers, sensitizing the public and building the administrative/logistical support structure) started in the four medical regions. Between June and December of 1981, the program would be simultaneously extended to one sector in each of the four regions. Since there are an average of about 8 or 9 health units in a sector, there would be approximately 35 health units (dispensaries or health centers) giving immunizations by the end of FY 1981. Thereafter, the program will extend into one additional sector in each region each year. By June, 1984, the program anticipates that the total geographic area of the country will be covered.

There was at the time of the plan a total of 178 dispensaries and health centers. Population of all Burundi as of 1985 was projected as 4.3 million (perhaps a little low). Therefore, there will be an average of one immunization center per 24,000 population. The program assumed that each fixed health station would effectively reach 15,000 persons or approximately five/eights of the population.

Since a large part of the population in rural areas (perhaps over 50%) live more than 5 kilometers from a health center or dispensary, this estimation of coverage is optimistic. However, the government's Five Year Plan anticipates an extension of additional health centers, The planners appreciate too,that mobile immunization teams will be needed to reach the more remote populations.

The program, as designed, concentrates mainly on incorporating immunization programs into integrated health services at fixed health units. The extension of these services beyond dispensaries and health centers is considered as a second phase after 1985. The methods and plans for the second phase activities will be based on the Ministry of Health's experience in implementing phase one.

The time schedule for giving each antigen is consistent with world-wide practice, i.e.: a) BCG at birth or at the time of first contact, b) DPT and polio at 3, 4 and 5 months,and c) measles 9 months, but not older than 2 years. If DPT or polio is started later than 3 months, then second and third dose is given at subsequent monthly intervals, or later if the mother fails to return on time.

The 1979 Census Data indicates that about 7.3% of total population of Burundi is in age group 0 - 2 years of age. If one assumes this population at the beginning of CY 1981 to be approximately 4.1 million and that annual population growth through 1985 will be about 2.2% and that the program coverage of

children 0 - 2 years will be 10% in 1981, 20% in 1982, 30% in 1983, 40% in 1984 and 50% in 1985 (as planned) then annual immunization targets can be calculated, with results as shown in the following table (all figures in thousands rounded off).

C.Y.	EST. TOTAL POP.	EST. POP. 0 - 2 YRS.	IMMUNIZATION TARGET
1981	4,100	293	29
1982	4,183	305	61
1983	4,275	312	94
1984	4,369	319	128
1985	4,465	326	163

These annual targets should be compared with the number of immunizations reported to the Department of Epidemiology, Ministry of Public Health, for the country in recent years. These are summarized in the following table:

Number of Vaccinations Reported

Burundi 1976 - 1979

(in thousands, rounded off)

CY	BCG	DIPTHERIA, WHOOPING, TETANUS, DPT.			POLIO			MEASLES
		I	II	III	I	II	III	
1976	90.7	15.9	12.0	9.6	o.9	0.7	0.3	0.5
1977	15.5	14.0	11.4	8.3	8.9	8.9	4.7	4.3
1978	19.3	12.1	9.0	8.1	3.8	3.3	2.5	23.6
1979	34.5	15.8	11.0	7.4	12.2	9.0	7.6	16.4

Although data for 1980 are not yet complete, reports for the first three trimesters indicate that immunizations will be about the same level as in 1979, with measles and first dose of DPT at about the 16,000 level and BCG decreased to about the 26,000 level.

The best indicator of program coverage is the level of measles immunization. It only requires a single dose, and is near 100% effective; because of the prominent role of measles in early deaths in Burundi it will have the most immediate impact. Measles immunizations currently cover about 5% of the population at risk, about 10% of the program's 1985 target and about 55% of the 1981 target. In other words to meet the program targets, measles immunizations, as compared to existing levels, will have to double in 1981 and increase 10 fold in the next five years.

While government data indicate that 45% of health units have been offering immunizations (70 of 156 on which information was available), the distribution of these units is skewed, for example, 90% of health units in Bujumbura and Ngozi Cities offer immunizations, 54% in Gitega City and a considerably smaller percentage in the more rural sectors: e.g. Citiboke 33%, Ruyigi 31%, Matana (Bururi region) 0. This, of course, reflects the existing pattern of an urban or semi-urban oriented delivery system. It also reflects the logistical constraints (lack of refrigeration facilities and proper equipment in the more rural areas).

In general, the medical units at the religious missions are more apt to offer immunizations than the government supported health stations. Again this reflects better facilities, refrigeration, transport to directly pick up vaccines in Bujumbura and a greater sensitization of mission health staff to the need for prevention. The mission's initiative, however, to independently launch immunization programs as a high priority is not very outstanding. This is evidenced by the 5% country-wide coverage of measles immunizations in children under 2 years, while the missions provide perhaps over 60% of health services in the truly rural areas. All health stations recognize measles as the prime killer in infants.

UNICEF has been supporting immunization programs in Burundi since 1976 including vaccines, vehicles, refrigerators, cold chests and cooling elements (cold dogs) and a full-time administrator/logistic technician. Commodity inputs through 1980 include:

12 vehicles

95 kerosene refrigerators

98 cold chests

1960 cold dogs - cooling elements (expandable)

UNICEF vaccines provided in 1978 and 1979 compared to vaccines issued

VACCINE	QUANTITY IN DOSES			
	1978		1979	
	Rec'd	Issued	Rec'd	Issued
Measles	25,000	25,000	65,500	15,000
DPT	100,000	92,000	112,500	38,000
Polio	137,000	63,000	147,500	92,000
BCG	60,000	60,000	100,000	15,800
Tetanus	87,000	10,000	None	8,000

Despite the poor utilization of vaccines in the past, UNICEF will continue to supply vaccines provided the program demonstrates its capacity to utilize them. Under the reorganized new expanded immunization program, UNICEF has agreed to furnish the following commodities in addition to the vaccines and the continuation of the UNICEF administration technician:

- 4 more vehicles to a total of 16
- 20 more refrigerators to a total of 115
- 72 more cold chests to a total of 170 (with cold dogs)

AAO/Burundi in March 1981 completed a project agreement with the GRB which will furnish in the next two years (1981 and 1982) assistance valued at about $340,000 consisting of:

FY 1981 ESTIMATED TOTAL $ 314,230

Capital Equipment ($165,000)

Refrigerators, freezers, cold boxes, thermos, type vaccine carriers, thermometers, vehicles and motorcycles

Tentative list:

5 vehicles
28 motorcycles (and helmets)
60 refrigerators
60 cold chests
180 thermos vaccine carriers
2 freezers
110 refrigerator thermometers

Personnel ($10,000)

Four CDC consultants which include two logistics and two training consultants (financed from AID funds outside this project) and one consultant to participate in multidonor evaluation at the end of the first year.

Training ($20,600)

Two short-term in-country courses for 100 health center personnel and training of one refrigerator mechanic.

Other Costs ($37,700)

Spare parts for refrigerators, vehicles and motorcycles, rotating fund for UNICEF kerosene, posters, printing, etc.

Inflation and Contingency ($80,430)

FY 1982 ESTIMATED TOTAL $25,400

Other costs ($18,900)

Inflation and Contingency ($ 6,500)

AAO/Burundi may also furnish a 6 months administration/technician to assist with stock inventory cold chain and other early logistic needs.

The UNFPA (The United Nations Fund for Population Affairs) has recently signed an agreement with the Ministry of Health for a MCH/Family Planning Project designed to foster child spacing and reorient and train Burundian health staff in family planning concepts and techniques.

The agreement specifies that a new subdirection of maternal child health/family planning be created as a subdirection in the Ministry of Health Department of Epidemiology, Hygiene and Laboratories. There are considerable inputs in training health educators and reorienting the existing MOH staff in health education techniques. It also has substantial inputs in capital equipment for immunizations including such items as: 60 refrigerators, 20 cold boxes and 3000 syringes.

It appears that this project was planned and agreement reached without relating it to the ongoing UNICEF assistance to the Program for Expansion of Immunizations, although the bulk of the commodities would be furnished by UNICEF. It also appears that many of these items duplicate similar items that UNICEF has agreed to furnish, or has already furnished.

At the Ministry of Health, national, regional and sector levels, there doesn't appear to be any clear plan as to how the Program for Expansion of Immunization and the new MCH/Family Planning Program would interrelate or coordinate implementation of services which are constantly overlapping.

3. Family Planning

UNFPA (United Nations Fund for Population Activities)

The first project with a true family planning component was signed in December, 1980 between the UNFPA and the Government of Burundi. In addition to strengthening the Ministry of Health infrastructure, the project has activities in family health and birth spacing for MCH personnel and training programs in family health services and rural sanitary education. Additional training abroad will be provided for a medical technician and the doctor responsible for the project. The project will attempt to inform the population of birth spacing techniques and provide to interested couples, family planning services under the medical supervision of the regional and peripheral hospitals.

Serveral other projects affecting family planning have also been undertaken by UNFPA. They are:

a) The Population Census

A census count, preceded by a pilot census a year earlier, was understaken in August, 1978. The results of this census are available in "Resultats Provisoires" (Provisional Results) published by the Central Bureau of the Census. A post-census sample survey was conducted and attempted to obtain data on fertility, births, deaths and housing as well as breakdown of population by age groups. This data is available in "Resultats Bruts Partiels de l'Enquete Post-censitaire, 1979" (Incomplete Raw Data of the Post

Census Survey, 1979) published by the Department of Population.

b) Improvement of the Civil Registration System

The main objective is to strengthen and improve the system of recording births, deaths, marriages and other vital statistics at central, regional and local levels.

c) Center for Demographic Research and Population Programs

The above mentioned center was set up in the Ministry of Interior in June, 1980 to analyse data provided by the various censuses and the vital statistics of the civil registration offices. Additional activities include the teaching of demography at the University of Bujumbura by a U.N. expert in demography. An internship program will also be set up at the center for students specializing in demography.

CARITAS

A birth spacing training program has been established by CARITAS for use in Catholic mission health facilities. Written in Kirundi, the printed course outline offers basic information on spacing systems such as "rhythm" and Billings. Courses are given at the religious health centers by "monitrices" and the materials are said to be available for the "foyers sociaux" for use in government health facilities but field investigation at such centers did not reveal activities along these lines.

B. Multisectoral

1. Nutrition/Food Production

USAID studies indicate that:

Burundi is well suited to agricultural production and is capable of growing a wide variety of crops. Of the total area of 2.7 million hectares, about 200,000 are lake, about 1.4 million are considered suitable for pasture. Of the potentially arable area, about 50,000 hectares are in export crops, (coffee, tea, cotton), about 1.2 million in food crops and about 150,000 uncultivated. The economy is predominantly agricultural, crops, livestock, fisheries and forestry accounts for approximately 65% of the GDP. About 90% of the population is directly dependent on agriculture for a livelihood, except for export crops, the agricultural sector produces almost entirely at the level of subsistence. The pressure of population on available resources is becoming increasingly severe, nutritional levels are deteriorating and the land is being over-exploited (Section I, B).

Between 1970 - 1977, the output of major crops (maize, beans, cassava and sweet potatoes) increased very slowly while the population grew at a much higher rate, resulting in a decline in per capita production of those products.

Agricultural yields show substantial declines, presumably as a result of the decline of seed material, use of fertilizer and overuse of land.

In the agricultural sector, cash export crops (coffee, tea and cotton) amounted to 8 - 10 percent of total production, while subsistence crops accounted for 70 - 80 percent and livestock products 5 - 10 percent. Forestry accounted for about 3 percent and fisheries less than 1 percent.

Most farm food production is consumed by the farm family with only 5 - 7 percent reaching the market. For cash income, farmers depend upon sales from coffee trees, from occasional seasonal surpluses above family needs of beans, peas, cassava and grains, or from off-farm employment. About half the farm population raises some coffee, which since mid-seventies has been a particularly lucrative source of incomes (high coffee prices also resulted in less food production in certain areas).

Along with a poor life quality index (poor nutrition, low literacy, lack of medical care, lack of clean water, etc.), rural Burundians, especially women, work very hard for what little they get in return. The agricultural work force (approximately 2.2 million persons) is said to be working at 80 percent capacity. Because men often migrate to cash crop work, women are left behind to cultivate their husband's fields, performing up to an estimated 80 percent of the agricultural work load.

Two rainy season plantings are common throughout Burundi, the first occurs in September with a harvest in February, and the second crop is planted in February or March with a harvest in June or July. Those having access to hilly ecession

lands (only approximately 10 percent of the farming families) can plant a third crop in June or July with a harvest in October. All major Burundi crops (beans, sweet potatoes, cassava, sorghum, maize, peas, white potatoes and grains) can be planted during each of the two rain-fed seasons. Coffee is generally harvested in June and July with the farmer receiving the bulk of his cash income during this period. The most difficult period for the farm household is between November and the first harvest in February. Food tends to be in short supply preceeding the February harvest due to limited production by each household and heavy losses due to poor storage.

Only a small percentage of the farmer's agricultural production enters the market. The difference between the rural producer price and the consumer price in Bujumbura is large. This is due to lack of competition among market intermediaries, high transport costs (gasoline is selling at approximately $4.50 per gallon), and high storage costs. There are few market outlets for the Burundi farmer: rural markets are infrequent and often at a great distance from the farmer. Usually a farmer installs himself along a principal highway, to await one of the traders who pass by truck. The farmer is relatively disadvantaged as he does not know when or if the next truck will pass.

Coffee is collected in the same manner, truckers are to pay the farmer the official government producer price, although widespread claims of underpayment are common. A farmer's cash

income is derived from coffee sales and some vegetable and banana sales.

Organized government extension is quite ineffective in Burundi. The farmer only sees the extension agent when he makes an inspection of the producer's coffee trees. Official policy is to promote coffee growth for export, as it represents the principal source of foreign exchange for Burundi. World coffee prices have been high since the mid-seventies encouraging conversion of lands previously used for food production into coffee. In the short term, it has increased some rural incomes. However,

1) The Burundi farmer only receives about 20% of the final export price for coffee.
2) The World Bank projects a decreasing world price for coffee in the 1980's.
3) Devoting additional labor and land to coffee results in decreasing food production.
4) The farmer is increasinly obliged to rely on purchased food.
5) Decreasing supplies cause food prices to increase.
6) The farmer's purchasing power subsequently declines

The government of Burundi currently imports very little food, (with the exception of limited quantities of PL.480 title II, World Food Program food, and wheat flour for urban consumption . They wish to remain self-sufficient in food. As a landlocked

country, 1,400 kms. from the nearest port, imports of all goods are prohibitively expensive.

Increasing coffee production to the detriment of improved food production does/will not improve the standard of living of the rural farmer. While data are either non-existent or unavailable, evidence exists to indicate higher incidence of kwashiorikor and malnutrition in areas of the highest coffee production. Conversly, the "poorer" province of Ruyigi appears to have less malnutrition according to one highly placed source, as the land is not suited for coffee. There is a surplus of beans and peanuts. Therefore, while per capita cash income in this province is lower, (and indeed the land of relatively poor quality), food production and consumption only seasonally falls below subsistence level. Due to a lack of internal markets, this surplus does not reach other areas of the country, which effectively negates any effort at farmer specialization, or increased food production for trade, in areas unsuited for cash crop production.

Production data and the GDP indicate that food production levels are declining. We can conclude that nutritional intake is directly correlated to these declines and is also declining.

The government has clearly recognized the need for improved agricultural methods and increased food production. However, there is no real system of producer credit in the agricultural sector and no effective government extension reaching the rural producer of food.

USAID studies available reveal that not all farming households in rural Burundi are self-sufficient in basic food crops. The small size of the family fields and their declining productivity force many families to rely on purchased food items. These families must use revenue from the sale of coffee or from other sources (limited) to sustain themselves after their own food sources have been exhausted. It appears that a substantial number of households, lacking necessary financial resources, are forced to reduce daily food intake until the next harvest. Food availability in rural areas is primarily a function of season and is more limited in variety than in Bujumbura.

The major food items available to the Burundi population are:

a. Grains

Maize which is often the most important grain in the Burundi diet. In grain form, it is often boiled in water and mixed with beans. Grilled corn on the cob is common. Corn flour mixed with water, cooked and served as a mush is also common.

Sorghum - Millet are eaten only on a limited basis. Some sorghum is used in beer preparation.

Wheat flour is imported and used for bread in urban areas.

Rice is sometimes imported for use in Bujumbura, although local rice is grown on the plains bordering Lake Tanganyika. Rice is most often cooked in water, less often with oil,

the national level. The personnel working in this department will be sent abroad for programs of varying lengths.

"Recyclage" in-country is being done at the present time to sensitize the personnel in the area of preventive medicine. This is starting with the higher levels of personnel and will continue until all levels are sensitized. Other recent "recyclages" in Burundi are dealing with having a global strategy for treatment, diagnosis and health education.

Rice with tomatoe sauce is served with meat or fish.

b. Tubers, Root Vegetables

Sweet potatoes are usually boiled and are a major staple in the Burundi rural diet.

Cassava is usually boiled or fried; cassava flour is commonly used in various mushes, cakes and porridges.

Taro is usually boiled, occasionally prepared with beans, oil, onions.

White potatoes are eaten (boiled, fried, mashed) in the urban and high altitude areas.

c. Legumes, Vegetables, Fruits

Beans are the major protein source for rural Burundians. Brown, white and fresh green beans are common. Beans are usually boiled, used in soups or served directly after cooking. Most beans are dried. Bean dishes with oil, onions or garlic are also popular.

Peas are generally boiled.

Bananas- the yellow banana (musa sapientum) when ripe is eaten raw. Green bananas are often boiled. The long yellow banana (musa paradiska) is generally fried. Most banana production is destined for banana beer production.

A number or other fresh produce items play a role in the Burundi diet which varies with conditions in each region. Carrots, onions, cauliflower, cabbage, tomatoes, cucumbers, spinach, pinapples, strawberries, avocados, guavas, limes, grapefruits, papaya and mangos. These items are expensive and consumption is

more common among higher income urban groups.

d. Animal Protein Sources

Meat - per capita beef consumption is very limited. Cattle are a source of wealth and status; regular marketing of cattle is rare. Goat, sheep and chicken consumption is also low. Eggs are expensive, eaten more frequently by higher income groups.

Fish consumption is primarily limited to Bujumbura and areas near Lake Tanganyika. The lack of internal transport and markets account for extremely limited fish consumption in rural areas. Interior lakes and rivers are not well stocked. Some traditional taboos surround the consumption of fish as well.

Milk is the most important source of animal protein in Burundi. Milk production on a per capita basis is relatively high. Cheese and butter processing is low.

e. Peanuts

In areas where peanuts are grown, their consumption is important. They are eaten in the form of whole nuts or oil. Peanut and palm oil is used in cooking. Accessibility and income determine the frequency of their use. Salt and sugar are used, income permitting. No data is available in-country on foods other than the above items. Some evidence indicates "gathered" foods may play a role in rural diets.

Food availability and resulting intake vary with respect to age, sex, region and income. In urban areas, sweet

potatoes, cassava, maize and bananas are the staple items in a low income diet. Price increases caused by increasing demand for beans have led to some per capita diminution in urban bean consumption. In a low income diet, Bujumbura fish would be more likely consumed than higher priced meat. The importance of each of these foods would vary with seasonal availability and consequent price levels.

Regional and seasonal variations to the diet are more pronounced in rural areas, as individual farm production determines the daily diet. Since family food production is limited, and on-farm storage methods inefficient, little food is stored beyond a crop season. The production from a harvest must sustain the rural family until the succeeding harvest. Bananas are available most of the year. Most rural households do interplant a variety of crops for variety and to minimize risk.

The quality of information regarding nutrition and consumption is poor and inadequate. Based upon USAID studies, only the most broad conclusions can be reached, and certain deficiencies noted.

Information from the Burundi Plan, FAO, and the World Bank confirms the dominance of sweet potatoes, cassava, beans and bananas in total agricultural production, as well as the relatively low individual animal productivity. Fish production given the abundant resources of Lake Tanganyika,

as well as certain inland bodies of water, is very under-developed.

Estimates from all sources differ widely complicating an accurate assessment of food consumption and demonstrating the need for more comprehensive and precise data collection procedures.

WHO and SEDES studies indicate a low daily caloric intake (1,900 calories/day). The situation could become progressively more serious as an increasing Burundi population places additional pressures on per capita land availability. Food production on a per capita basis will fall unless compensatory agricultural development programs are successfully introduced.

The daily diet is subject to great socio-economic variation, the high cost of food relative to a family's overall financial resources is evident.

The SEDES report discussed the extent of food consumption variation between men and women. Their findings suggest that caloric intake by an adult female could be 10 - 15% less than that of an adult male in the same family. No information for male/female children was provided though local sources indicate that little distinction is made between male/female children at least until puberty.

The inferior caloric intake by females can be explained by two factors:

1. All sources queried agree that traditional eating patterns favor adult men. They eat first, and choicier food items and greater quantities of food are usually reserved for them.

2. Males receive greater caloric intake by virtue of their greater consumption of banana and sorghum beer.

The SEDES study further indicated that the variation in caloric intake by sex was most pronounced in the 25 - 34 age group. Since most women are pregnant or nursing during this age period, such deficiencies pose potentially serious problems for mother and child. In addition, Burundi women apparently work considerably more hours than men, intensifying nutritional problems associated with lower mean caloric intake from women.

Some indications point to serious qualitative nutritional deficiencies among children. Clearly the 15 - 45 adult male is benefiting from the greatest caloric intake. Women and children seem to be the most vulnerable age group from the perspective of nutrition. Deficiencies seem to be more qualitative than quantitative, although many of this group undoubtedly suffer from an overall lack of caloric intake, at least seasonally. Nutritional and health problems caused or aggrevated by an inadequate diet are accentuated by seasonal, income and regional factors.

Any discussion of nutritional problems must be qualified by the absence of accurate, up to date data.

The SEDES Report using 1971 data indicates that mean per capita caloric intake of foods is probably not greatly below recommended standards. In the succeeding ten years, one may assume that the additional population, coupled with declining yields, and increased land use for cash crops, has undoubtedly

further reduced per capita food supplies. The problem may even be more acute in the future as farms are further divided for inter-generational transfer.

Those groups suffering most from insufficient food/caloric intake are a) women of child-bearing age and children, b) inhabitants of Muramvya and Ngozi and part of Gitega (coffee producing, densely populated areas), c) rural and urban poor, d) seasonally affected groups from November - February.

The extent and seriousness of protein caloric deficiencies among children are subject to conflicting reports. There is no doubt that abruptly weaned infants and those children affected with measles exhibit symptoms of malnutrition, though most health personnel questioned throughout the country reported that clasic kwashiorkor was relatively rare (exceptions: Muramvya and parts of Gitega). Visual evidence at health centers in all regions with the exception of Ngozi confirmed these reports. Of course, knowledge of the nutritional state of children was limited to those who were brought to health facilities. Mothers who attended well baby clinics, report indicated, were those who lived within 5 - 10 kms. As no comprehensive program to reach the less accessible areas exists, knowledge of the status of those not using fixed center services is based upon incomplete, outdated and inaccurate data.

In Muyinga region, per capita bean and maize availability is above the mean. Consumed together, the beans (with a high protein content themselves) facilitate the release of

protein from the maize. Thus it may be assumed that protein intake would be enhanced in this area. In less advantageously situated areas like Ruyigi, bean and maize per capita availability is less, therefore protein intake would be more of a serious problem.

Weaning foods composed of high carbohydrate cassava are an important factor to protein deficiencies among children. Attention has been given recently to introducing soybean supplement into the child's diet. One constraint to this is the long cooking process needed for soybeans. Declining wood supplies force children and women to search over increasingly dispersed areas for wood. Additional pressure on forest resources, and increased expenditure of energy by those collecting wood, render the soybean a relatively inefficient source of supplemental protein. Continued use of beans, with milk, oil, animal/fish, peanut and egg supplements would be more desirable.

The government of Burundi has no national nutritional program. Although one of the expressed goals is to maintain food self-sufficiency, and to eventually produce an exportable surplus of food products. Increasing farm incomes and improving the quality of life are major priorities as expressed in the Five Year Plan.

But, at the moment, no national effort is beyond the talking stage. Various missionary groups actively involved in the provision of health services with an emphasis on nutrition, report that mothers are not resistant to the introduction of new foods. One group in Muramvya reports that with the introduc-

tion of Catholic Relief Services preschool food distribution program which is integrated into the well baby clinic, regular attendance at the Kwashiorkor clinic which averaged 60 - 80 children/week two years ago has decreased to 4 - 6 children/ week. Attendance at the well baby clinic has increased from 200 to 600 per week. Reports from other mission supported health facilities are similar. In those areas where action oriented health/nutrition education is part of the health services, acceptance by the population has been positive. Unfortunately, most of these programs are limited to mission groups at present. Most government facilities are unable to replicate the missionaries experience.

In general, international and national energies should be geared toward:

1. Improving quality and quantity of food production and consumption in Burundi.

2. Acquiring reliable and comprehensive information about food intake and resulting deficiencies.

3. Promoting and implementing a national nutritional program which includes outreach.

4. Promoting, implementing a storage/marketing program to facilitate transfer of products from deficit to surplus regions.

2. Community Mobilization Through Health Education

Prior to any discussion of community mobilization through health education, a brief look at the government of Burundi's Five Year Economic and Social Development Plan for 1978 - 1982 is revealing. It indicates the expressed importance the government places upon health education and how it plans to implement a program aimed at improving the status of its rural population:

"Section 2.2.2.7: The health sector, neglected by the old regime will be made the object of particular attention by the Party and the government. A special effort will be authorized to improve:

1. The identification and elimination of endemic disease.
2. The health infrastructure and provision of necessary supplies, as well as,
3. The extension of a program of preventive medicine.

This program must be accompanied by the reinforcement in the training of medical and paramedical personnel,of the importance of the task of health education of the population. The effort to decentralize health services undertaken in 1977 will be pursued until the services are brought as close as possible to those who have greatest need. These services will be integrated into all the units of rural development."

Section 2.3.1.: Policy and Economic Measures

"... In effect, the government regards birth spacing and other forms of birth control which conform to the mentality and trad-

itions of the country, necessary. This requires, however, an effort in education and information which will be conducted by the Party in close collaboration with the technical health services."

The government, therefore, has officially stated that health education and information is important to its expressed goal of meeting the needs of its rural population. It has provided a medium for the provision of services - the Party (UPRONA) working with the Ministry of Health. The Party is, in fact, well organized and well placed in the rural areas to assist in community organization and health education.

In spite of the scattered household pattern of social organization, and the almost total lack of a village structure, the Party system has proven to be efficient and capable of reaching all levels of the rural population.

The rugo is the smallest social unit. It is basically a homestead surrounded by a fence which (according to 1979 Census data) is made up, on the average, of 1.3 nuclear families, i.e. 6.4 people.

One cell is made up of ten such rugos and an appointed Party member is responsible for these ten homesteads. He is directly responsible to the chief of the zone, an appointed Party official responsible for ten cells. He in turn is answerable to the Party chief of the commune. There are 79 communes in Burundi which roughly correspond to U.S. counties.

The number of zones per commune vary depending upon the population density.

In all, every individual in Burundi is reached through the Party. They know exactly who is on the hills and, in fact, it is through the Party structure that individuals receive permission to leave. Informed sources speak with awe of the efficiency of the Party system. The Party is currently involved on a limited basis in community and health related activities. It is through this system that the one day per week obligatory community work program is implemented. They are also responsible for mobilizing mothers for the pilot vaccination program in Muramvya province. Regular meetings are held which conceivably could include an active program of health education. As the appointed Party chiefs are from the local areas which they serve and are not outsiders, they not only have positions of authority and are intimately involved in the area where they serve, but would also be direct beneficiaries of any services implemented.

While any outside group cannot directly intervene in Party affairs, if the government of Burundi chooses to use the Party structure to implement its expressed goals of reaching its rural population, technical assistance in developing a comprehensive program might very well prove to be effective. Party members might very well be a target group for training in health education, community health, organization, etc. in conjunction and

collaboration with the Ministry of Health and Social Affairs' personnel.

The Plan continues: "The health sector occupies, in reality, a key position in the process of development, a position which the third Plan must permit it to attain."

Section 4.6.3.2.: Objectives

"The fixed objectives for the Five Year period rest upon the principle of the realization of social medicine by decentralization of health services to bring them as close as possible to the population."

In spite of the expressed intent of the government to pursue an active program aimed to reach those in most need, capital investment is being centered around fixed centers and in Bujumbura. Donor contributions are heavy on commodities short on implementation. By policy statement, the Ministry of Health has been decentralized (see Chapter III). The degree that this has in fact been done is covered in more detail elsewhere in this report (Ibid).

Within the Ministry of Health on the national level, the subdirection of hygiene (preventive medicine) is placed under the Department of Epidemiology and is virtually neglected. With the exception of the director, who is a sanitarian, there is no professional staff and essentially no budget.

Rural hygiene, health education, nutrition/ nutrition education, maternal and child health and industrial health, all fall under this subdirection. It is, therefore, no surprise that little progress has been made in any of these areas in spite of the expressed priority they hold. In general, efforts of the government are directed at improving and expanding curative services at fixed centers.

On the regional level, doctors are chiefs of medical regions, and directors of hospitals who are also responsible for supervising health centers and dispensaries in their areas. They are occupied with administration and the functioning of their respective hospitals and are hard pressed to visit regularly the centers in their regions. Material and logistics deficiencies are their most frequently expressed concern. Not the least of which is the cost (about $4.50 gallon) and subsequent small allocation of gasoline, and poor to nonexistent vehicle maintenance.

Their training has basically prepared them to treat patients. Few are prepared to function in their role as planners and managers of public health services administrators or supervisors of personnel.

The regional personnel, therefore, are not prepared to initiate any significant outreach, health education activities. All emphasized the need to "sensitize" the population before any efforts on their part to provide services would be effective.

They are uncertain how to proceed without firm policy direction and an implementation plan from the central level. Thusfar, no such action has been forthcoming.

With no direction or encouragement from their superiors, the paramedical personnel: medical technicians, nurses, auxiliary nurses, sanitary technicians and technical assistants, who are charged with providing health services at the health center and dispensary level, certainly are not active in any health education/community activities.

Inappropriately trained, poorly supervised and supported, without adequate medicines and supplies, they are ill prepared for their task. On their own, there is little to motivate them to perform any but the most routine tasks, and nothing to encourage them to reach out to an individualistic, possibly suspicious population. Sources indicate that morale is low and one source reported that the effect of isolation is all too apparent after 2 -3 years, even among those who had been among the most gifted and highly motivated.

Women who attend prenatal and well baby clinics are treated to "lessons", but the message is inconsistent and often not practical, not taking into consideration the woman's needs, or means at their disposal.

It is not fair to compare the work being done by Roman Catholic and Protestant missionaries to that being done in government facilities. The mission centers are for all intents

and purposes self-sufficient, in terms of financing, logistics support, and organization. Health education and community health are integral parts of the services provided; materials are available, and resources generally efficiently utilized. Inevitably, larger numbers of people make use of the services and preliminary results of a health education/preventive medicine approach are promising.

The population is receptive. Nutrition education is accompanied by food preparation and baby feeding as well as gardening. Mothers attending the clinic work in the center's garden and take home seedlings for their own gardens. Consultations are organized with the convenience of women in mind, morning and afternoon to take into account the varying distances women must walk. Peronnel are motivated by the progress they see and the receptivity of the mothers. Most come regularly. Most missions make use of health education materials provided by CARITAS at a minimal cost. Results at mission centers indicate that women (already overburdened with work) will come from 10 - 15 kms. for services which meet some of their needs. Although most deliver at home, they do receive instructions during prenatal consultations on basic precautions and preparations for the delivery.

In conclusion, the experience of the missionaries provides valuable information and should be taken into account if any effort to develop and implement such activities is undertaken.

Promotion des Affaires Sociales

The direction of the Ministry of Social Affairs and Labor is actively engaged in implementing activities aimed at reaching the rural population, although budgetary constraints inhibit many of their activities. Animators work out of "foyers sociaux" and "foyers d'animations" frequently in proximity to health facilities. Collaboration between workers and the social affairs animators depends mostly on the personal relationships between the two groups at a particular station. The success of this collaboration depends largely on the attitude of the health staff. The Five Year Plan does not give much emphasis or specificity to the work of the Ministry of Social Affairs.

Section 4.6.4.: Labor and Social Affairs

Considered as a minor domaine by previous development plans, the social affairs and labor sector will be an area of improvement in the course of the next plan.

In this regard, it is indespensible to assure social justice proposed by the second republic and to take to this effect, social,promotional and protective measures which will have to accompany economic growth in order to arrive at a harmonious and integrated country development.

Section 4.6.4.1.: Objectives

To create a social awareness to prepare the population to better understand the phenomenum of development, to become useful using the means most available, and to improve the quality of life particularly in the rural areas.

Investment is largely for construction and equipment as evidenced by the table below:

INVESTMENT BUDGET SOCIAL AFFAIRS 1978 - 1982 PLAN

in millions of FBU

Promotion Social	78	79	80	81	82	Total
Foyers Sociaux	32	30	30	30	30	152
Ateliers Sociaux	15	15	14	14	12	70
Equipment/Repairs	16	15	15	12	12	70
Total	63	60	59	56	54	292

There are approximately 65 "Foyers Sociaux" located throughout Burundi run by women who are trained as social workers in Gitega. Staffed by "monitrices" and "animatrices", the foyers are engaged in teaching literacy, basic nutrition, and agriculture. Although open to all Burundis, most attending classes are young unmarried women. There is a national program and an attempt has been made to gear coursework to regional problems. Unfortunately the basic program is very theory oriented,

and not really applicable to the needs of the rural poor. Personnel do attempt to make coursework relevent within the limits of the program available.

Attempts to increase their accessibility to the Burundian mother are being made. "Foyers d'animation" are being located closer to centers of population. "Monitrices" and "animatrices" actually go out to the population making home visits. The personnel only cover a radius of 5 kms, as all visits are made on foot. At this time, however, the emphasis should not be on extending coverage but on the development of collaborative health programs and its contents.

The monitors/animators must - and this point was emphasized - be back at the foyers before nightfall. It is believed to be dangerous for them to spend the night in an area where they do not have family (see Chapter I,E). Time spent actually working with women is extremely limited. The population resists home visits and women often run away and hide among the banana trees when they see someone coming. With all the constraints involved, however, the will is present, and these women are making every effort to fulfill their stated role with almost no resources at their disposal.

Technical assistance in training, program development and financial assistance within"promotion sociale" could very well be the first step toward the development and implemen-

tation of a national health education/community mobilization/ outreach program, into which the Ministry of Health and other services could ultimately be integrated. There is priority need for an intersectoral planning/implementation committee representative of the Ministries of Health and Social Affairs (and perhaps others: e.g. Plan, Interior, Rural Development).

UNICEF has sponsored seminars aimed at providing midlevel functionaries of any ministry with health information in order to set a pattern for coordinated health education with a consistent message. Initially, the Ministry of Health expressed no interest in sending any of its personnel. Once begun, however, they wished to participate. These seminars do not occur on a regular basis, and were only begun because of the personal interest of the UNICEF representative. However, this option or something similar may be fruitful is strongly and consistently supported by other donors.

UNICEF has enjoyed some success in community mobilization in its spring capping project; using monitors who are functionally literate in at least Kirundi. Trained by UNICEF, they mobilize their communities to provide labor and local materials for the capping of the spring, as well as supervise the actual work. Organized through local administrators, the program resulted in the capping of more springs than projected. Unfortunately, the project is now out of funds.

These experiences suggest that rural people can be motivated and mobilized to actively participate in meaningful health related activities, despite the commonly expressed opinion that individualistic social and cultural structure inhibits it. What is lacking is a coherent plan and action to accomplish this.

3. Rural Water Supply Development

It is evident that clean water is a problem in Burundi as there is a high incidence of water-borne diseases. Intestinal parasites are widespread, and there have been cholera outbreaks in recent years.

Burundi has an average annual rainfall of 900 - 1500 mm, therefore, water is abundant. However, it is neither necessarily easily accessible nor clean. People get their water directly from springs, rivers, lakes and swamps. These are often a great distance from the "rugo", and thus a long walk up and down the hills is necessary in order to obtain water. Thus, even though the water exists, the amount available to a family becomes limited, so quantity is a problem.

UNICEF estimates needed water usage at 30 liters per capita. For a family of 6 that is 180 liters per day. A family that walks a long distance to get water is going to fall short of this figure. What water there is will go to priority needs such as drinking, cooking, the animals and the garden. Thus, the hygiene of home and personal hygiene will suffer when there is not enough left over for bathing, washing clothes and washing-up around the house. It is the children of the "rugo" who are sent for water. They will often bathe in the source as that is easier than carrying the water home. This causes further contamination of the water. Also, animals are often brought to the various sources to drink, which causes contamination as well. People

want to have some water left in the house overnight, as it is believed to be necessary in order for God to create.

According to the Post-Census Survey of 1979, 83% of the rural population gets their water from springs. These springs may be either capped or uncapped. There is piped water in Bujumbura, but according to the same survey, there is running water in only 28% of people's homes. Seventy percent is dependent upon sources outside the home. Some of this is through public faucets. There is piped water to some degree in the provincial capitals of Gitega, Ngozi, Bururi, Muyinga, Ruyigig, Muramvya and Bubanza. But even so, according to WHO, only 17% of the urban population is able to meet its quantitative needs for water. The figure drops to 10% for the rural population. This says nothing about the quality of the water.

The Five-Year Plan 1978 - 1982 cites the need for a regular water supply. They also cite that a particular effort will be made to increase the supply of potable water through the capping of springs.

The capping of springs is being done through a project of UNICEF. Their goal is to cap 4,300 springs and to repair the approximately 2,500 already capped springs. This is to be done in conjunction wi:h health education in schools, dispensaries and "foyers sociaux" on how to use and maintain clean water. The project also hopes to provide safe water for schools and dispen-

saries through gravity schemes, and where gravity schemes are not feasible, through rain-collecting devices. Capping of wells began in September, 1979 with the emphasis in the areas affected by cholera. At the present time, the project is operational in 38 communes; with 515 springs having been capped. The strength of the program lies in that it is a simple method for having clean water, and that its implementation rests on the participation of the local population to do the necessary excavation, and to supply local materials. Its weaknesses are that the health education portion has been largely ignored, and that it does not address itself to the problem of quantity of water. The capped springs can provide the necessary amount of clean water, but it is just as far to walk to the springs after it is capped, as it was before. At present, the project has run out of funds. The phase providing clean water for schools and dispensaries has not yet begun. Additional funds are being sought.

Any additional monies presently invested in potable water are in the urban areas, most notably West Germany's contribution toward the water supply for Bujumbura.

For the United Nations "Decade of Water and Sanitation", WHO is planning to work in close collaboration with the National Commission of Water and PNUD. There is nothing more specific on this at the present time.

In the Ministry of Public Health, the Department of Hygiene

is involved in rural water supplies. They have an interest in projects that are simple, involve the participation of the local population, but that will increase the quantity, as well as the quality of water, an example being a rain-collecting device which can be constructed in each "rugo". They are hampered by lack of funds.

This department is also involved with health education in the area of clean water. At the present time, they are only doing this on the radio and through the newspaper. Face-to-face education is dependent upon the personnel already posted to the rural dispensaries and health centers.

4. Environmental Sanitation

The high incidence of parasitic disease is also an indicator of a low level of environmental sanitation.

One problem is the disposal of human waste. There is a problem with lack of latrines and if they do exist, they are often not covered. Both conditions lead to easy transmission of fecal-borne diseases. According to the Post-Census Survey of 1979, even in Bujumbura, only 27% of the population has an indoor toilet. The figure is 5% for Burundi as a whole.

The Department of Hygiene has a campaign to encourage the digging of proper latrines, as well as a hole for solid waste disposal, and for having a compost heap in each "rugo". Publicity is being done on the radio and in the newspaper, but the surveillance of seeing that it is done lies with the Party and the interior

administration. Families with children in school who have learned to use latrines or who have other members who have started using latrines, will often be influenced to build a latrine as those members will no longer want to go just anywhere outside the "rugo". People are also influenced by how close a neighboring "rugo" is; whether or not there is enough space to go outside the "rugo". Not enough space increases the probability of a latrine.

Waste disposal in general is a problem. The vast majority of the population has neither public sewerage nor adequate means of waste disposal. There is no water-borne sewerage system. In the principal towns, sanitary waste goes into septic tanks. There is no regular trash collection in Bujumbura. Solid waste poses less of a problem in the rural areas because there is less of it, as people recycle many things.

The Five Year Plan states that special attention must be given to the extension of the hygiene program.

A project with PNUD was signed in 1975 for the construction of sewers. At the present time, the office, office materials and project personnel exist but there is no money for the actual implementation of the project itself.

WHO plans to work with REGIDESO for sanitation in Bujumbura. There are no further details.

The UNFPA/MCH project is concerned with systemizing MCH activities and this includes environmental hygiene and education in that area.

At the present time, education in the area of hygiene rests mainly with the personnel of the dispensaries, health centers and "foyers sociaux". It is hoped to eventually have both a sanitary technician and a sanitary assistant in each dispensary and health center.

V. Other Contributions to Health Sector

A. Role of Foreign Assistance

AAO/Burundi updated the 1980 Other Donor Report on February 12, 1981. It summarizes the capital investments, technical and other assistance, both grants and loans given by foreign donors in 1980. This section is based largely on that report with supplementary information gained during the assessment.

In health services development, per se, the principle countries that furnish bilateral assistance are Belgium, and France with smaller but substantial inputs from Japan, Russia, Cuba, Italy and recently Algeria and Saudi Arabia (not yet firm). The principle multidonor agencies are UNICEF, UNFPA, UNDP and WHO with smaller contributions from the European Development Fund (FED).

In development of water and sanitary facilities, West Germany is the major bilateral contributor mainly in urban (but some rural) water supply systems, with Belgium and France third. UNICEF, the World Bank, the African Development Bank, the Arab Development Bank for Africa, and UNDP are the main multilateral agencies (loans) involved in environmental improvements related to health and sanitation. The only agency that has provided any appreciable assistance in family planning and population areas is UNFPA. The type and scope of foreign

donor assistance in the health sector is summarized below.

Health/Medical Services/Development and Training

1. Bilateral Assistance

a. Belgium

Technical Assistance

- 13 health advisors (11 doctors) full time
- 5 health advisors from Anvers Institute of Tropical Medicine, short term courses in tropical medicine.
- 1 newly arrived medical entomologist for malaria studies Ruzizi River Valley.
- Studies of schistosomiasis are planned to start in 1982.
- Mobile teams to dispensaries North of Bujumbura - training and logistic support by Belgian Tropical Medical Fund (FORMETRO).
- Sanitation training.
- Leprosy control.

Grants (Health Services)

- Production essential drugs, National Office of Pharmaceuticals (ONAPHA)	700,000 US$
- Tuberculosis Center, Bujumbura	300,000
- Center for Handicapped in Kihanga (co-financed)	200,000

Grants (Environmental)

- Urban water supply, Bujumbura area (second phase)	1.8 million

- Rural housing (self help) 1.85 million
- Improvement of water supply Ngozi (1979) ?

b. France

Technical Assistance

- 1 doctor and 1 laboratory technican for the National Laboratory at Foreami, Bujumbura
- 2 doctors and one anesthesia technician, Muyinga Hospital
- 1 doctor mobile team, Kinazi, trepanisomiasis surveillance, tuberculosis survey and immunization program, Muyinga area
- 8 professors medical school, Bujumbura

Grants (Health Services)

- Medical supplies and equipment, Prince Regent Charles Hospital, Bujumbura 445,000

Grants (Environmental)

- City planning/Urbanization 445,000

c. West Germany

Technical Assistance

- 1 Advisor for general planning of water supply, Bujumbura
- 3 Advisors to the water supply plant, Bujumbura

Grants (Health Services)

none

Grants (Environment)

- Improvement and extension of water supply, Bujumbura, (first phase) 3.6 million
- Improvement and extension of water supply system, Gitega 1.3 million
- Reconstruction of water pipeline, Lake Tanganyika to Bujumbura's water plant 192,893

d. Japan

Grants (Health Services)

- 14 ambulances for hospitals, medical equipment and medicines (funds provided for purchase of these items from Japan) estimated at about 1.0 million

e. Italy

- Doctors, nurses, equipment and vehicles for two rural hospitals in Mubugu and Kiremba and a dispensary at Mutoya.

f. Algeria

- Grant agreement signed early FY 1981 to construct a health institute in Gitega 2.0 million

g. USSR

- 12 doctors for government hospitals at Bujumbura, Ngozi and Bururi
- Training of medical students in USSR and graduate training health staff

h. Cuba

- Doctors, nurses and laboratory technicians at regional hospitals in Bururi, Gitega and Ngozi

i. Saudi Arabia

- A 5 million US$ hospital in Bujumbura is scheduled, grant agreement not yet signed.

2. Multilateral Assistance

United Nations

a. UNDP

Integrated Habitat Development

Project: a pilot project in Musaga (population 25,000 + environs of Bujumbura) of integrated aided self for low cost housing and environmental improvement. West Germany is assisting with extension of piped water supply system and with drainage. The Republic of China is improving the road. UNDP plans call for a health center and an integrated community health program (preventive and curative services) but has not yet found a sponsor. Executing agent is the UN Conference of Human Settlements (UNCHS) LOP $1.33 million; FY 80 $229,300.

Health Services

Funded by UNDP LOP $1.7 million

FY 80 $ 505,400

Implemented by WHO (described under WHO projects)

b. UNICEF $ 750,000

Child Health (FY 80: $140,000)

Includes retraining of nurses and auxiliary personnel, provision of vaccines, vehicles, refrigerators and other items for the expanded immunization project (previously described in Chapter IV, A, 2 of this assessment report),

provides: 1 Administrator/supply advisor (full time) and
1 Motor maintenance advisor for the UNICEF/MCH garage

FAO/Burundi has just signed an agreement with the GRB to add supplementary support to this project

FY 81 - FY 82 $ 340,000

Child Nutrition

FY 80: $ 100,000

Provides seeds, fertilizers, insecticides and tools to farmers (mainly women) in Gitega province to increase family food production and consumption to lower malnutrition among children and mothers

Social Welfare Project

FY 80: $ 72,000

(Ministry of Social Affairs).

Trains "monitrices" working in the "foyers sociaux" to teach nutrition, sanitation, food production, animal husbandry and home economics to rural women.

Appropriate Technology

FY 80: $ 64,000

(Ministry of Social Affairs).

Provide farmers, mainly women, with locally made

implements such as jars, silos and other storage items, dryers to help food conservation and facilitate women's tasks.

Potable Water

FY 80: $ 168,000

(Ministry of Rural Development)

Provides safe water in rural areas by capping of planned 4,300 springs repair and development of damaged springs. Also has plans to extend water to rural health and social centers and to other areas inaccessible to safe water supplies. $800,000 has been expended to date. Funds are said to be exhausted.

LOP 1978 - 84 : $7,576,100

This project is under consideration for AID funding.

c. UNFPA (United Nations Fund for Population Activities)

FY 80: $ 230,156

Population Census Project

(Ministry of Interior)

Assisted with design and execution of 1979 Census - now following-up with Post-Census Sample Survey

1978 - 1982 $ 1.2 million

Improvement of the Civil Registration System

Review of current system for recording vital events, births, deaths, marriages, etc. and pilot testing of revised system contributes advisory services, training and equipment. LOP $ 519,200

Center for Demographic Research and Population Programs

Helped GRB establish this center in the Ministry of Interior, June 1980 - focus for work and analysis on Census, Post-Census Sample Survey and civil registration. System research also cooperates with Faculty of Economics and Administrative Sciences at the University on courses in demography and serves as training center for demography students.

3 technical advisors, support for national research personnel, scholarships, in-service training and small amount of equipment. $ 311,350

Maternal and Child Health $ 1.1 million

UNFPA funded (implemented through UNICEF and WHO)

This new project that for the first time includes family planning activities in the context of family health services started in December, 1980. It will create a new sub-direction of maternal and child health services (and "child spacing") within the present rather amorphous Department of Epidemiology, Hygiene and Laboratories.

Headed by the project director, the project is designed to sensitize and train health staff in MCH/FP approaches and techniques. It also has inputs in health education and considerable capital equipment related to immunization programs. The need to relate and coordinate this program with the expanded program of immunization was discussed in Chapter IV, A, 2.

d. W.H.O.

Health Services

(co-financed with UNDP $ 484,900
WHO $ 108,000)

Mainly training of health personnel with some direct medical services and small amount of commodities. Technical services include: a public health physician, a surgeon, a pediatrician, two gynecologists, a sanitary inspector, a midwife, a public health nurse and an administrative technician (for the GRB Immunization Program). Service areas are mainly medical service sites and medical school, Bujumbura and Health Training Institute, Gitega.

Expanded Program of Immunization

Short term consultant $ 18,000

Sanitation Improvement

Funds for sanitation, funds for sanitary inspector and some supplies $ 62,500

Training of Medical Personnel

Short term consultants for training in public health $ 80,500

Scholarships

20 in 1980 $ 60,700

e. European Development Fund (F.E.D.)

- Construction/equipment of small hospital in Kirundo expenditures to mid-1980 $ 1.4 million
- Research - grant to study primary liver cancer
- Scholarships in public health

B. Role of Private Sector

The role of the private sector in the Burundian health sector is minimal. Burundian physicians basically are employed by the government and are part of the Ministry of Health infrastructure. Private practice which exists is done by these physicians during their own time and only in the urban areas. One physician has received permission from the government to open a private family planning clinic in Bujumbura.

ONAPHA is a parastatal drug producing firm which imports ingredients and prepares drugs for sale to the government's three licenced private pharmacies in the country: Gitega, Ngozi, Bujumbura (see Chapter III, C.).

Overall efforts in the health area are made through the public sector.

C. Role of the Private Voluntary Organizations

Catholic Relief Services (CRS).

The CRS is active in food-aid distribution programs aimed at the most vulnerable population groups. Their major effort is a pre-school 2 - 5 supplemental feeding program reaching approximately 40,000 recipients through health centers and dispensaries. CRS is an important information source and potential implementing agency for nutritional and health education program support in Burundi.

CARITAS

The organization which coordinates all efforts by

Roman Catholic missionaries in the health sector also is an important implementing agent. They have at their disposal a health education program with materials available at minimal cost to anyone interested. Most missionary groups, Protestants as well as Catholic, take advantage of this service.

In addition, they provide regular in-service training programs for their personnel, an important element of which is practical health and nutritional education, home visits (See Annex 21), and outreach. They are well organized and reach large numbers of people through church sponsored health services.

World Food Program

The World Food Programs has four on-going projects in Burundi:

1. Supplemental feeding of wheat, eggs, fish, sugar and vegetable oil, reaching an estimated 7,000 patients per year in Burundi hospitals and health centers.
2. A school feeding program benefiting 16,850 children with balanced, nutritionally sound meals, including canned fish, meat, powdered milk and vegetables.
3. Food grants to those involved in resettlement projects are planned and a budget set aside for the time when resettlement becomes operational.
4. A self-help program for which road maintenance workers

are partially reimbursed with 3 rations daily of flour, canned fish and vegetable oil, reaching about 2,300 families.

Action AID

A British group is currently becoming involved in rural water projects, though current activities in the health sector are minimal.

D. Absorbtive Capacity of the Burundi Government

Compared to other poor African countries at a similar level of development, Burundi has a fairly high capacity to develop appropriate low cost essential health services. It is essentially free of corruption, has a reasonably good infrastructure and, at least in terms of numbers, has a close to adequate health staff if the considerable numbers of expatriate staff is included in the total. Although, like all lesser developed countries, it lacks sufficient numbers of middle level health managers and supervisors, it has a sufficient cadre of competent health professionals to direct and coordinate essential services.

Burundi, of course, because of its landlocked geographic location and difficult into-country transport, has serious problems in logistics, particularly maintenance and supply. Burundi, therefore, has a relatively low capacity to provide fuels and to maintain vehicles and equipment. It, therefore, cannot effectively implement and continue to operate health projects that are heavily dependent on these items.

The main difficulty is, however, that the present system based largely on sophisticated medical care requires a large amount of complicated equipment and a complex network of supply and maintenance. The logistics department of the ministry is therefore severly over burdened. This need not be true if the overall policy was to simplify the health delivery system towards primary health care. Under such a concept, the government would be fully capable of extending essential health services and could absorb substantial assistance in this area.

VI. Review of Health Sector Constraints

A. Resources Shortages

1. Manpower

One of the oft-repeated problems in Burundi in the health sector is the lack of personnel. However, in the instance of most categories of health personnel, the problem is apparently one of distribution rather than one of numbers. The personnel exists, but too many are posted to urban rather than rural health units. Given the objectives of distribution of personnel within health facilities, given in Chapter III, C., 5., in 1980, there was a surplus of registered nurses and auxiliary nurses, with shortages in the areas of medical technicians and sanitary assistants. Even if you count only the Burundian doctors, there are more than enough to staff the rural hospitals with some left over to help meet the other staffing needs of doctors in Burundi. The chart on page 182 summarizes future needs and actual numbers of health personnel in Burundi. It is based on the GRB's projections for number of health facilities and personnel needed for each facility; and the projection for personnel to be trained yearly, from Chapter III, C., 5., added to the personnel now in existence.

Actual distributions between nurses and auxiliary nurses are unclear, so are estimated, but so many already exist and are being trained, that it is clear that the number will far exceed the need. The chart does not take into account attrition, as the rate is not known. It should be quite low, however, as people are unlikely to leave government

YEAR	No. Medical Technicians		No. Registered Nurses		No. Auxiliary Nurses		No. Sanitary Assistants	
	Actual No.	Projected Needs	Actual No.	Projected Needs	Actual No.	Projected Needs	Actual No.	Projected Needs
1980	196	224	394	189	465	224	87	161
1986	321	238	594	189	690	238	187	175
1987	346	289	634	189	735	289	207	226
1988	371	335	674	189	780	335	227	272
1989	396	369	714	189	825	369	247	306
1990	421	391	754	189	870	391	267	328
1991	446	399	794	189	915	399	287	336

positions, so it would mostly either be by death or retirement. Even without taking attrition into account, it is clear that the number of sanitary assistants is insufficient, and this is a category that is totally concerned with preventive health care; so that, that aspect of health care has the potential to suffer. By 1986, the number of medical technicians should be sufficient. Given attrition, this may be a little borderline and not clearly a surplus, as with the registered nurses and nursing auxiliaries. The problem of medical technicians is complicated by the GRB's desire to have at least one member of the team at the dispensary or health center be a male. Thus there may be a shortage of male personnel, while there are females in abundance.

Doctors are not included in the chart. However, given the number that already exist added to the number now being trained, the problem will tend to be too many doctors rather than not enough. At the present, part of the training for doctors is abroad, so some are lost, as they prefer not to return to Burundi. But beginning with the graduating class of 1983, all the training for doctors will have taken place in the country, cutting down on this problem. The projected number to be graduated per year is 20 - 30, which is far more than adequate, as doctors, except for a few exceptions, are posted to hospitals only.

The Burundi's problems in the area of health personnel tend not to be in terms of enough, but in terms of distribution,

training and continuing education. Training needs to put still more emphasis on preventive medicine, so as to have personnel capable of carrying out the GRB's desire to move toward preventive rather than curative health care. The lack of a regular program of "recyclage" contributes to a lack of quality personnel. The GRB recognizes the need for "recyclage" as that is one of the issues addressed in the Five Year Plan 1978 - 1982. There is some provision for "recyclage" in the UNFPA/MCH project. However, this addresses itself to specific "recyclage" and not to the problem of ongoing education, which is necessary in order to maintain a staff functioning at the maximum in terms of quality.

2. Facilities and Equipment

Burundi does not have enough rural dispensaries and health centers at the present time to meet their objective of having one such facility for every 10,000 population. They hope, also, to have no one more than 15 km. from a center. In order to meet their objective, the GRB is planning to have 336 health centers by the year 1991. However, as pointed out in Chapter II, E., the GRB's projection is based on an inaccurate estimation of the rural population, and also does not take into consideration population growth. Thus, in order to meet the objectives, the actual need is 504 centers. Therefore, the shortage of facilities will continue. Due to the difference in population density in the various parts of the country, using and average of 1 center per 10,000 population means those people in the less-densely populated areas will have further to go to

reach a center, and thus be less likely to use it.

If the number of needed facilities is actually 504 centers, there is a change also in the number of health personnel needed by 1991. This change is summarized in the following table:

Medical Technicians		Auxiliary Nurses		Sanitary Assistant	
Actual No.	Projected Needs	Actual No.	Projected Needs	Actual No.	Projected Needs
446	567	915	567	287	504

Thus, even though the number of auxiliary nurses remain more than adequate, there would be a shortage of medical technicians to run the health centers. The shortage of sanitary assistants would be even greater than with the GRB's projected 336 centers. Registered nurses are not considered as they are not slated to be posted to health centers.

The Five Year Plan 1978 - 1982 expresses the objectives of equipping hospitals to meet their needs. The projects signed by the GRB reflect this objective and are a means for procuring needed equipment; which extends to equipment necessary for health centers as well. The recently signed UNFPA/MCH project contains a substantial amount of equipment.

Maintenance of equipment presents another problem, due to the lack of adequate personnel to do repairs, and the difficulty in obtaining parts, equipment shortages can exist, not because equipment is not there, but because it is not functional.

In the area of preventive health care, the government run dispensaries are lacking in health education materials. The mission run facilities have developed many of their own, and are more likely to take advantage of those available from CARITAS.

B. Manpower Development

1. Training

At the present time, there are six kinds of health personnel being trained in Burundi:

- doctors
- medical technicians (roughly equivalent to a nurse practitioner)
- registered nurses
- auxiliary nurses
- sanitary technicians
- sanitary assistants

Doctors are now being educated at the University of Burundi in Bujumbura, and the first group to be fully-trained in Burundi is due to graduate in 1983. Medical technicians, registered nurses and auxiliary nurses are trained at the Medical Institute in Gitega. Sanitary technicians also spend the first year of their training in Gitega in the same course as the medical technicians. They then finish at the the School for Sanitary Technicians and Sanitary Assistants in Bujumbura where the sanitary assistants are also trained.

The highest level of personnel are, of course, the doctors. They follow a 6-year course of study. Previously, education was begun in Burundi but finished abroad as in Russia, Belgium and France. But the program has begun to have all the training taking place in Burundi. The first four years have been already instituted.

with the fifth year to be added in the fall of 1981, and the sixth the following year, so as to have the projected first graduation in 1983. Entrance into the program requires completion of secondary school.

The next level is comprised of medical technicians, registered nurses and sanitary technicians. They receive three years of theoretical training and one year of practical. Practical time is also included during the three years devoted to theory. Trainees at this level have had four years of secondary education before entering the program.

Auxiliary nurses have two years of secondary school before entering their training. They receive two years of theory and one year of practical training. As in the other programs, practical training is also included during the first years.

Also requiring two years of secondary education is the program to train sanitary assistants. This is another program with two years of theory and one year of practical.

The GRB, in its Five Year Plan 1978 - 1982, emphasizes the revision of the public health towards the preventive side of medicine and away from the curative. One of their objectives is to strengthen medical and paramedical training so that this personnel can function at a level of maximum efficiency. As it is important to get the population to begin adopting preventive health practices, there is a declared emphasis on training in doing health education for medical and paramedical personnel.

There was a national commission that met between July, 1977 and April, 1978 in order to revise the curriculum for all categories of health personnel, except for doctors. With the GRB's emphasis towards prevention, still only approximately 10% of the time in the theoretical portion of the program for medical technicians and registered nurses is devoted to subject matter dealing with prevention. The 8½ months of practical training all takes place in various hospital services except for one month in a health center. The time in the health center should provide time for some preventive activities. The auxiliary nurses have about 12% of their theoretical training time devoted to preventive subjects. By definition, sanitary assistants and sanitary technicians are positions dealing with prevention, and their programs are devoted almost exclusively to prevention.

According to the objectives set down by the national commission that revised the curriculum, after their training, the medical technicians and registered nurses should be able to manage a health center; do the necessary paper work; do consultations, primary care and routine curative care; make appropriate referrals; and carry out preventive activities such as vaccinations, health education and MCH activities. The time in training devoted to management is only one hour per week during the first year of theory. There is no explicit practical application, except once again it may take place to some degree during the one month in the health center.

The objectives for the auxiliary nurse lean heavily towards the psycho-sociological, the cultural and preventive aspects. She is expected to do things as home visits, health education, understand cultural barriers, give uneducated mothers moral support in time of need, and to evaluate and help remedy the social effects of an illness. However, only about 12% of her theoretical education deals in these areas. It is deemed necessary, however, for her to work in collaboration with a parallel program of someone from social affairs, a social worker or at least a social animatrice. In addition, she should be able to do more traditional tasks, such as organizing consultations of infants, working at the bedside of the sick, maintaining daily registers, and keeping watch over materials and medications.

Both the sanitary technicians and sanitary assistants, after training, should be able to work in the areas of protection of and promotion of clean water supplies, the proper elimination of wastes, vector control, the hygiene of food, the hygiene of the home, and health education in these areas. The sanitary technician works at a higher level than and supervises the sanitary assistant. The subjects covered in the training of both are relevant to these objectives.

Thus, although education of the sanitary technicians and the sanitary assistants seems to be appropriate to the objectives regarding their skills, the programs for the medical technicians, state and auxiliary nurses, still lean too heavily towards traditional

education to allow them to adequately meet their objectives in terms of management and prevention.

The personnel of the Department of Social Affairs are involved in health and nutrition education through the "foyers sociaux", and as previously stated should be working in close conjunction with the auxiliary nurses. They have three classes of personnel. The social workers have seven years of schooling after primary school. Both the social "monitrice" and social "animatrice" have three years of secondary school. In addition, the "monitrices" are given six months of specialized training and the "animatrices" eight.

2. Continuing Education

At the present time, there is no regular program of continuing education or "recyclage" for the medical and paramedical personnel. Instead "recyclage" is done as the need arrives. These "recyclages" may be done in Burundi or there exists the chance to attend special programs abroad. The grants to go abroad usually affect higher level personnel and are donor-financed.

The UNFPA/MCH project includes "recyclage" for all levels of health personnel in the various disciplines of public health; so as to have qualified personnel to carry out the program. This will include the workers of the "foyers sociaux" due to their role in health and nutrition education reaching the rural population. The project provides for a MCH and Family Planning Department at

C. Population Growth

Probably the most fundamental constraint is the absence of a strong definitive family planning statement in the Third Five Year Plan. While the plan does mention the necessity of "spacing of births and other forms of limitation of births", it qualifies this by indicating that these measures must be"adaptable to the mentality and traditions of the country". The GRB feels the latter can be accomplished through an educational program sensitizing the rural populace.

The above has been tempered recently by the concern on the part of some GRB officials about the rapid rate of population growth and the seriousness of the man/land ratio. However, this has not been translated to official policy.

Assuming a firm and supportive family policy at the national level, there is considerable evidence that rural people would not accept family planning practices because of cultural and attitudinal constraints. First and foremost, there is an almost universal desire among the people to have large families. Better a poor family with many offspring than a rich family with few or no issue. More children provide an additional work force for the women who perform most of the farm work and act as a kind of "social security" for old age. Not to be overlooked is the self-pride of women who are able to produce progeny for her husband. Among high fertility countries, Burundi is one of the few where the desired number of children (8) exceed the actual number (6).

Medical personnel at the health level still consider family planning to be a sensitive area and are not willing to take an active approach until a national policy is enunciated and put into effect at the hospital and dispensary level. There is little expressed opposition on the part of the medical level to family planning and most are aware of the effects and significance of population growth in terms of its impediments to health, well being and economic development.

Another serious constraint is the status of the rural health delivery system now in place and planned. At present, the system works well at the fixed-site hospital and dispensary level, but it is not very effective in outreach to the "rugo" dwellers on the collines. The isolation of the "rugos" and the inaccessibility of the collines by motor transport make outreach, supervision and follow-up difficult and expensive. This same scattered population pattern also makes for difficulties in any program aimed at educating or sensitizing a rural population with a low literacy rate.

The training for the rural health auxiliary staff, although lengthy - lasting three years - is theoretically oriented with little or no hands-on, practical community health experience. This staff has not been fully tested at the colline level and their motivational level is unknown.

Except for birth spacing, the attitude and support of the religious mission operated health services - especially those operated by Roman Catholics - is undetermined, but they are not

considered to take a strong leadership position in the field of population planning. Their participation can be considered crucial since perhaps more than 60% of the health services that reach the rural population reach them through the missions.

Traditional religion must also be considered a restraint rooted as it is in a fatalistic value system. People believe that it is not necessary to add to what God ("Imana") has created and that it is more difficult to effect change than to let things remain as they are.

An almost universal lack of knowledge of conception and contraception exists among women of the "rugos". According to the Robatel study of 1974, less than 20% of the women of the study area had any idea of when conception occurs or the length of time after childbirth it took for a woman to become pregnant again. Less than three-fourths of the women were aware of any contraceptive methods and of those that were knowledgeable of one method, nine out of ten cited abstinence. A more recent study indicates an improvement of these figures.

VII AAO/Burundi Health Sector Assistance Strategy

A. Review of Sector Constraints and Identification of Priority Assistance Areas

Constraints

Population and Family Planning Activities

1. There is no clear national government policy that firmly endorses the promotion of effective family planning measures or the control of population growth. There are statements in the Five Year Plan and other more recent statements made by highly placed officials within the Ministries of Plan and Interior that express concern about the effects of uncontrolled population growth and appear to support more forthright measures including spacing of pregnancies and perhaps the use of modern methods of family planning. These can only be interpreted at this point as tentative and perhaps exploratory statements. They do not necessarily stem from a clear consensus nor do they respresent a firm committment at the very top of the national level of government.

2. There is almost no evidence that government officials and field workers in health and other related fields of social development are sensitized to the necessity for family planning. This, in part, may be due to their strong pro-natalist and somewhat fatalistic shared cultural heritage and their lack of background to appreciate the economic and social consequences of

uncontrolled population growth. However, it is unlikely that these are the most dominant influences. Most of the government officials with leadership roles and those responsible for supervision of operational staff are fully aware of the mounting problem of the man-land pressures in Burundi. They are reluctant, however, to address the problem in terms of the need to limit births, probably because of a lack of a clear endorsement of such views and actions on the part of the government.

3. There is, at this time, no established system for delivering health services beyond the fixed health units (hospitals, dispensaries and , in some cases, health centers). At present, only about 10% of the rural population is accessible to these fixed units and access is mainly on foot. Future plans of the government, if fully realized, would increase the numbers of these fixed units so that by 1991, there would be a health center or dispensary for each 10,000 people in the interior, which includes 95% of the population. There is no plan or expressed intent to develop health outreach services beyond these fixed units. There is the intent expressed in the Five Year Plan of extending integrated health and social services to the periphery by inter-sectoral collaboration. There is, however, no action plan defining how this would be accomplished and no evidence that efforts in this direction are underway.

4. The education and training of health staff (doctors, nurses, nursing auxiliaries and medical technicians) is not

appropriate for their future roles in planning, managing, supervising, providing and evaluating essential health services in the rural areas. The training gives prime emphasis to hospital or health center based medical care. Training in the sociological and managerial concepts and practices of public health and preventive medicine are largely neglected and is based essentially on the system of medical health care used in the more developed countries and not adapted to the reality in Burundi. Virtually no attention is given to demography, population problems or family planning. Little preparation is given to the arts and skills needed to work effectively with people and communities.

Auxiliaries and medical technicians who are being prepared mainly to staff health units in the rural interior are trained primarily in the classroom followed by a year of practical training in hospital type medical care. There is no "hands-on" supervised practice in community-based health services. Health workers trained under such a program will not be very effective in recruiting women for family planning nor in educating or counseling family planning acceptors.

5. Cultural mores are contrary to wide-spread acceptance of family planning. Births are highly valued. Children gain status for both women and men. A woman perceives a large family of future helpers as her only escape from a lifetime of

arduous work. Childless mature women are regarded as valueless.

6. Women's knowledge of conception and contraception is very limited. Few rural women are familiar with contraceptive methods. Of those who indicated knowledge of contraception, the majority mentioned abstinence as the method of contraception.

7. Traditional and established religious beliefs, with the destiny of an individual subject to the will of an all powerful God, fosters apathy and fatalism. More than 60% of health services in the rural areas are provided by missions - predominantly Catholic - and the influence of the Catholic Church is strong. The willingness of the priests and sisters to actively promote modern methods of contraception is doubtful, and up to the present untested, since government policy exerts no pressure or support for these services. Protestant missions, although more active in promoting family planning, are not, up to present, a major influence.

8. The household scatter patterns of rugos and collines, relatively isolated from each other socially and not easily accessible geographically, makes the extension of any type of community service difficult. Although some informed observers believe this problem may be exaggerated and that government workers use this as an excuse for not implementing outreach programs, the physical and logistical problems of reaching people in their homes is nontheless substantial. Success would depend on a whole

hearted commitment, strong central and decentralized support, high motivation, conscientious supervision and tangible incentives within the service delivery system. None of these factors are evident.

Priority Assistance Areas

1. Policy and Sensitization of the National, Regional and Sector Levels

a. Continue the process of "sensitizing" Ministry of Health and Ministry of Interior officials towards a favorable attitude for family planning and the rate of population growth.

This would include the RAPID presentation or a similar type of presentation that dramatizes the socio-economic consequences of rapid population growth. Continue to send government officials to attend the Johns Hopkins seminars on population planning and demography.

Provide indirect assistance to the establishment of a private family planning clinic in Bujumbura City through private voluntary agencies such as IPPF or the Pathfinder Fund. If such efforts are successful, they should be replicated in other urban areas of Burundi.

b. Supplement UNFPA activities of in-country training of existing health staff at regional hospitals and health centers

in family planning methods and techniques.

Doctors should be trained in IUD insertions, fertility methods and other means of population control such as the use of pills, condoms and gels.

There would be no necessity to provide commodities through AID since UNFPA is providing adequate numbers of devices. No vehicles should be provided through AID.

c. The established private family planning clinic in Bujumbura City should be used to "sensitize" medical and nursing students in family planning methods and techniques. Courses should also be considered in demography and population problems.

d. UNFPA has taken a leadership role in training in demography and in collection of vital statistics such as births, deaths and marriages. AID can consider supplementing UNFPA efforts in these areas only if gaps exist in coverage areas.

e. Establish a"recyclage"training program for doctors, nurses, nursing auxiliaries and medical technicians at the fixed field-site service level in the concepts, methods and techniques of population problems and family planning services.

f. Introduce family planning methods and techniques into undergraduate training programs in Gitega for nursing auxiliaries and medical technicians.

g. Introduce courses in reproductive physiology and

birth spacing into the Foyers Sociaux program. Training should also be included for the animatrices who provide instruction to mothers attending classes in these areas.

Constraints

2. Related to the Extension of Essential Health Services to Rural Areas

The constraints related to such factors as inappropriate training of health staff, excessive emphasis on medical care, lack of health delivery system beyond fixed installations and the sociological and geographical isolation of individual household groups are also constraints to the extension of other essential health services, including simple community-based medical care, immunization programs, health education and improvements in environmental sanitation.

In addition, certain other constraints related to health development must be mentioned. These include:

a. Poor organization of the Ministry of Health at the national level. The main defects are: over centralization of authority and responsibility; a non-functional organization pattern in the Department of Epidemiology and Laboratories, within which the program for expanding immunization will operate; severe weaknesses in the planning unit; and no viable structures for the development, back stopping, and coordination of environmental sanitation and health education activities.

b. Fragmented mechanisms for collecting and analyzing health-related information and health statistics. Reporting is incomplete and this information is little used in health planning. There are almost no studies of the prevalence of the common communicable disease nor of health related conditions, such as the status of nutrition in different populations. Without established baselines, planning is difficult and future evaluation nearly impossible.

c. Cumbersome financing procedures which make local purchases slow and difficult. This results in under utilization of maintenance and repair crews and long downtimes for vehicles and other general purpose and medical equipment. This is further aggravated by non-standardization of vehicles and equipment and long delays (often 6 months or more) in off-shore procurement of spare parts.

d. Problems and delays in the distribution of essential drugs to peripheral units despite a well-designed and reasonably well-administered drug supply system and despite the availability of adequate transport. It appears, however, that gains are being made in solving this problem to which the government apparently gives high priority. Again, rural people's accessibility to essential drugs and treatment for common illnesses will be limited by the lack of an outreach system from fixed health units.

e. General poor performance of the Ministry's health staff particularly in the use of health education techniques in their working relationship with the people.

f. Little evidence of coordination or collaboration of activities within the Ministry of Health with efforts in other Ministries, particularly Social Affairs.

Priority Assistance Areas

The most important overall need in terms of providing essential health services to the periphery is:

A change of government policy and support away from the present system patterned after western-type medical care programs towards the development of a health delivery system based on the concepts and principals of primary health care. Such change would require:

a. A strong government top-level supported central planning unit of the Ministry of Health with regular liaison and collaborative planning with the Ministries of Plan, Interior, Education, and Social Affairs and Rural Development.

b. A reorganization within the Ministry of Health to reflect a greater emphasis on essential health services which at the moment should be concentrated mainly on:

- Maternal and child health services including family planning,
- Simple accessible medical care for the most frequent illnesses,
- Control of communicable diseases, at first mainly through immunization programs with wide coverage of the rural population,

- The extension of the availability and accessibility of water in rural areas,
- Health education linked with and supporting the aforementioned priority services.

c. A reorientation of the health manpower teaching/training programs of the Ministry of Health and the Ministry of Education that would provide:

- More content and practice time in the principles and methods of preventive medicine and community health in the preparation of doctors and nurses. More relevant teaching/training for their future role in planning and managing community-based health services,
- More practical training and "hands-on" experience in implementing essential health services (as defined in b. above) in the training programs for medical technicians and nurse auxiliaries,
- More opportunities for training in administration and management for the Ministry of Health's staff and a review of the civil service system to assure that positions that require administrative/management skills in support functions are equitably compensated.

d. A streamlined more efficient system for providing funds for local purchases and better budget planning.

e. Reduction in the heavy burden carried by logistic and supply units of the Ministry of Health by:

- Standardization of vehicles and essential equipment, (This would require considerable understanding and cooperation from donor agencies.)
- Further reduction in the items on the category "A" drug and medical supply list. Aim should be to reduce the medications on this list to no more than fifty items.
- Continued efforts to expand the drug production capability of the National Office of Pharmaceuticals (ONAPHA) with particular emphasis on high volume, low cost production of the ten to twelve most essential drugs.
- Reduction of the number of drug items furnished to dispensaries and health centers to only ten to twelve essential items (the Burundian pharmacists know what these items are).
- Continued improvements in the decentralized supply distribution system at regional and sector levels with particular emphasis on improving and expanding the cold chain for the proper storage and transportation of vaccines.

f. Creation and development of a unit within the Ministry of Health (or perhaps elsewhere) for expanding rural people's accessibility to safe water.

h. Baseline studies that would better delineate the prevalence of certain diseases in different areas of the country, particularly for malaria, schistosomiasis and malnutrition in children one to four years old. The new program just starting for malaria with

assistance from the Belgian Institute of Tropical Medicine at Anvers is a start in that direction.

B. Proposed AID Health Sector Activites/Relationship to Sector Development

AAO/Burundi and the Ministry of Health has already signed a project agreement with the Ministry of Health for a total of $340,000 of assistance to the expanded immunization program in 1981-1982.

AAO/Burundi contributions to the immunization program subsequent to the end of 1982 should depend on resolutions of these issues plus the findings that result from the first joint evaluation of the project in the fall of 1981.

The evaluation team should particularly examine the capability of the National Office for Expanded Immunizations to mount a multi-antigen program of this magnitude through a cold-chain network to some 200 fixed health units, nearly all of which will require a kerosene refrigerator. The problems of kerosene distribution and widespread refrigerator maintenance and repair are formidable.

Perhaps vaccine storage sites should be limited to about 35 points - roughly equivalent to one per sector. This would provide one vaccine storage area for about 115,000 population and an at-risk population (0 - 2 years children) of about 8,000 for each vaccine storage area. Many of these sector level locations have electricity and some auxiliary power generators at

hospital sites. This would substantially reduce the need for kerosene refrigerators. Under such a revised plan, mobile vaccinators (probably male medical technicians) would extend vaccination services out to dispensaries and to other population cluster sites (without dispensaries) in peripheral areas from the onset. Transportation should be by car or motorcycle depending on the terrain. The extra costs for gasoline would probably be offset by savings in the purchase and distribution of kerosene and the repairs and spare parts for kerosene refrigerators.

If preliminary pilot studies show a low level of return visits for second dose DPT and polio in peripheral areas, it may prove more practical to concentrate the program at first only on measles immunizations trying for 80% coverage. This would have high impact, reduce the complexity of vaccine distribution/storage and facilitate highly focused health education programs that are easily designed, understood and administered.

The main general point is that the early preparatory stage of the immunization program should be testing alternative approaches, so that comparative evaluation is possible. Also if an outreach network can be established through a high impact program such as measles, and if government policy firms up for extending family planning information and services, these kinds of activities can later be extended through the same network. This is one strong reason that the UNFPA/UNICEF supported child health project and the program for expansion of immunizations should be carefully coordinated. There are, of course, others.

Accessibility to safe water for domestic use is a priority need in Burundi. Foreign donors, particularly West Germany, is providing substantial and much needed assistance in improving and extending central water supplies in urban areas. The GRB has a high interest in and gives high priority to, the development of safe domestic water. The cholera epidemic of 1978 dramatically demonstrated the danger of water-borne diseases. Diarrheas ranked among the first four most common causes of sickness and death in this report's analysis of the most common diseases of public health importance (Chapter II, A, B, C).

The UNICEF supported Rural Water Supply and Sanitation Education Project discussed in Chapter IV, B, 3 of this report demonstrates that the rural people highly value the development of small accessible spring source water supplies and are willing to actively participate in their improvements and maintenance. The methods used are simple and the work can be done by villagers with minimum technical guidance. About 550 have been completed to date at an average commodity cost (pipe, cement, reinforcement bar, etc.) of about $1000 per capped spring. Future production is estimated at about 600 springs per year. AAO should consider providing the commodity support element of this project at the multi-year FY 82, 83, 84 total of about $2.0 million provided UNICEF would continue the technical services component (one full time technician).

The UNICEF Rural Water Project which focuses on capped springs should not be considered the only opportunity

for implementation and extension of domestic water for rural people. AAO/Burundi should in 1981, request a short term consultancy through AID/W's centrally funded W.A.S.H. (Water and Sanitation for Health) project. The scope of work for such consultancy should be based on item 3 in WASH brochure; identification of targets of opportunity (future projects) in water supply and sanitation in respect to USAID missions. AAO/Burundi may wish to await the findings of this project before making a firm decision or committment for support to the rural development project, however, sufficient is known about the project to prepare and submit a P.I.D.

The GRB's plans and expressed intent to extend essential health services to the periphery are stymied by the over preoccupation with extension of the infrastructure in the context of a fixed facility health care system with prime emphasis on medical care. There are no plans for developing and using community based auxiliaries and the mechanisms for community interaction and participation have not been explored. AAO/Burundi should not become involved in the process of extending the existing system. Development in this area should be carefully followed. AAO should be receptive to requests for assistance if the GRB and the Ministry of Health become seriously committed to a reform of the system in accordance with the concepts and principles of primary health care.

If that should happen, AAO/Burundi assistance should be supportive in the form of a pilot area of about 125,000 population (i.e. sector scope). Emphasis should be on testing alternative methodologies and providing a field practice area for training paramedical (medical technicians, nursing auxiliaries) and possibly community health agents. In the final analysis, the success of any action project in providing essential health services will depend on whether or not a true outreach delivery system is established. As of the time of this assessment/ evaluation, it seems unlikely that the government operated health services will make a serious effort in this direction.

Ways should be explored to develop better joint planning and implementation between Ministries of Health and Social Affairs. AAO/Burundi should be prepared to support any initiatives in this direction. Support could be in the form of intersectoral in-country workshops/seminars on health education of the public and other aspects of primary health care in the Burundian milieu. UNICEF is interested in such an approach and could well collaborate with AAO/Burundi in this area. Funding and technical assistance is also available through AID/W's centrally funded contract, the American Public Health Association under the Accelerated Delivery System Support Project (A.A.D.S.).

AAO/Burundi should also keep informed about the Belgian studies about the control of malaria and schistosomiasis in the Ruzizi Valley area. AID world-wide has a special interest

and emphasis on applied research in these tropical diseases. AID/W also has centrally funded contracts to repond to needs for technical advisory services in this field.

Eventually, if the GRB gives whole hearted support to the extension of basic health services to the periphery, the availability of locally produced essential drugs will be very important. In a setting such as rural Burundi, no extension service is likely to succeeed without offering the people access to basic medical care for the most common ailments. ONAPHA is trying to expand its drug production capability. Although most of the assistance support has come from the Belgians, AAO/Burundi could well supplement these efforts in a small way: e.g. heat sealing equipment for packaging oral rehydration powders. The Ministry of Health has made progress towards improving their supply system for essential drugs. AAO/Burundi could build on the government's initiatives in this area, which is usually a first and very essential step towards primary health care services.

These kinds of support, if undertaken, would require close contacts with the Burundian and other country health professionals working in a variety of fields and activities. Such contacts can only be made and exploited by a resident health technician of broad background and interest. If AAO/ Burundi is undertaking programs in the health/family planning sector, such a health technician would be indispensable on the staff.

C. Relevance of Proposed AID Health Sector Activities and Relationship to AAO/Burundi, 1983 Country Development Strategy (CDSS)

AAO/Burundi's overall health strategy should be to firm up the government of Burundi's policy and support for population/family activities, while concurrently strengthening the government's committment and capability to make basic family health services accessible to most of the people. These basic family health services should include: maternal/child health care and family planning, immunizations, basic medical care, health education and improvement of water sources.

AAO/Burundi should focus sharply on those assistance activities that would have the maximum effect on reshaping the government's overall approaches to the delivery of health services. The main areas of AID assistance, directly or indirectly, should be:

a. health sector and intersectoral planning,
b. administration and management,
c. training and retraining of health manpower, and
d. commodity assistance later, only when truly needed and if the Ministry of Health develops sound implementation plans for their use.

To the maximum extent possible, AID's assistance to activities directly related to population and family planning in Burundi should be provided through intermediaries. AAO/

Burundi's role, in this respect, should be one of liaison, coordination, and evaluation of these other efforts. Only in exceptional circumstances, when there are special or supplementary needs not met by these intermediaries or other donor agencies, should AID provide direct assistance.

There are many constraints to the successful development of the sector. AID should therefore, be very cautious about making any major commitments (or implied commitments), unless the government demonstrates its sincere commitment to equitably extend essential health services. Such commitment should be manifested by its willingness a) to take forthright measures to restructure the Ministry of Health into a functional organization with clearly defined roles and levels of authority and responsibility, b) to create and maintain an effective unit for health sector and intersector planning and c) to revise its present system for training health personnel and properly using them in the field.

Overall health strategy objectives as perceived by the assessment team, varies somewhat from that stated in the AAO/Burundi CDSS for 1983 which is to:

> "improve the delivery of health and family planning services to the rural poor".

In Burundi, where 95% of the population are rural and only about 100,000 of approximately 4 million people work for wages, it is not necessary to overemphasize the targeting

of AID's health and family planning assistance to the rural poor. In fact, the early acceptance of modern methods of contraceptions is more apt to occur in families that depend on wages, particularly among employed females.

The statement also does not incorporate such factors as time frame, cultural acceptibility, affordability (in terms not only of money but human and other resources), and quality and scope of health services. The statement could imply also that all health and family planning services will be "delivered" (presumably by the government) to the people without their active participation which is contrary to a fundamental principle of primary health care.

Since the assessment team is strongly urging a change in GRB's fundamental policy and approaches to the development of the health sector (i.e. away from "high quality" medical care towards prevention and basic health services), it seems prudent to qualify the health objective statement given in the 1983 CDSS as follows:

> "to make acceptable, affordable basic (or essential) health and family planning services accessible to most of the people of Burundi by 1991."

The general thrust of the strategy and specific activities proposed in this assessment, however, are very similar to those stated in the 1983 CDSS. The major difference is in the steps taken during the early stages and the degree

to which AID must become involved in the overall management and planning aspects of health sector development in Burundi.

The health assessment strategy is based on the premise that neither basic health nor family planning can be successfully extended down to colline and rugos, unless there is a fundamental change in the basic policy and planning of the GRB which would adopt most of the principles and methods of primary health care.

The assessment team also concluded that family planning programs, even with a strong supportive policy, could not be extended to the peripheral rural area without extension type health services beyond the fixed health units (hospitals, dispensaries, maternities and health centers). Therefore, the extension of family planning services are intimately linked to the extension of basic health services. This is not to say that some family planning activities could not start from fixed health units. In fact, this will likely be the case. At present however, this would reach only about 10% of the population in rural areas and the demographic effects would be negligible.

The health assessment team was also not willing to assume that because the GRB has made preliminary expressions of intent to promote and extend basic health services and perhaps to liberalize its policy towards family planning, that concerted action will necessarily follow. There are severe planning, managerial, cultural and resources (notably inappro-

priately trained and motivated health staff) and other constraints which have been fully discussed in this report. Unless AID, together with other donors (who are for the most part aware of these constraints), are willing to support government efforts at reform, it is unlikely that many real services to the rural areas will result. It is questionable, too, whether much will result even with everyones' best efforts. Therefore, we are not nearly as optimistic about the early opening up of sound assistance opportunities in the health sector as the 1983 CDSS tends to convey.

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ANNEX 1.

BURUNDI

POPULATION, 1979

PROVINCE	POPULATION			%		AREA	DENSITY
	TOTAL	MALE	FEMALE	M	F	SQ.KM	PERSONS PER SQ/KM
BUBANZA	329,060	164,030	165,030	49.8	50.2	2,712	121.3
BUJUMBURA	460,310	238,530	221,780	51.8	48.2	1,322	348.2
BURURI	457,510	222,070	235,440	48.5	51.5	4,957	92.3
GITEGA	682,990	322,950	360,040	47.3	52.7	3,447	198.1
MURAMVYA	380,320	183,500	196,820	48.2	51.8	1,546	246.0
MUYINGA	546,390	256,430	289,960	46.9	53.1	3,700	147.7
NGOZI	773,330	369,380	403,950	47.8	52.2	2,707	285.7
RUYIGI	392,000	187,730	204,270	47.9	52.1	5,718	68.6
TOTAL	4,021,910	1,944,620	2,077,290	48.4	51.6	26,109	154.0
INCLUDING BUJUMBURA CITY	141,040	78,530	62,510	55.7	43.3	-	-

SOURCE: " Provisional Results, 1979 Census "

ANNEX 2.

BURUNDI

PROVINCE	NUMBER OF: COMMUNES	COLLINES	DISTRICTS	SECTORS	RUGOS	HOUSEHOLDS
BUBANZA	5	142	42	305	53,400	63,280
BUJUMBURA	8	176	59	397	61,030	95,540
BURURI	11	285	59	454	66,970	93,380
GITEGA	11	383	92	667	104,150	154,030
MURAMVYA	9	227	53	376	47,240	80,470
MUYINGA	10	338	74	564	106,200	130,840
NGOZI	15	542	108	805	131,910	173,800
RUYIGI	10	367	53	453	67,170	87,540
TOTALS	79	2,460	540	4,021	638,070	884,880
INCLUDING BUJUMBURA CITY	-	-	18	109	11,590	28,020

SOURCE: " Provisional Results, 1979 Census "

BURUNDI

(without Bujumbura city)

POPULATION

(POPULATION EXTAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	162,233	79,346	82,887
1 - 4	507,230	252,324	254,906
5 - 9	523,314	263,487	259,827
10 - 14	478,119	239,661	238,458
15 - 19	470,797	233,419	237,378
20 - 24	387,729	189,241	198,488
25 - 29	272,190	134,325	137,865
30 - 34	199,147	90,330	108,817
35 - 39	169,257	73,465	95,792
40 - 44	155,212	68,903	86,309
45 - 49	137,025	63,741	73,284
50 - 54	108,636	46,696	61,940
55 - 59	79,467	36,191	43,276
60 - 64	83,187	36,851	46,336
65 - 69	59,240	25,689	33,551
70 - 74	46,758	23,350	23,408
75 plus	59,720	32,471	27,249
TOTAL	3,899,261	1,889,490	2,009,771

SOURCE: "Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX 4.

BURUNDI

(with Bujumbura city)

POPULATION

(POPULATION EXTRAPOLATED)

E GROUP	POPULATION EXTRAPOLATED			AS A PERCENTAGE			
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	M/F
0 - 0	167,695	82,088	85,607	4,15	4,17	4,13	1,01
1 - 4	524,730	261,542	263,188	12,98	13,29	12,69	1,05
5 - 9	541,144	272,485	268,659	13,39	13,85	12,95	1,07
10 - 14	493,460	247,480	245,980	12,21	12,58	11,86	1,06
15 - 19	489,739	244,520	245,219	12,12	12,43	11,82	1,05
20 - 24	405,801	199,725	206,076	10,04	10,15	9,94	1,02
25 - 29	285,824	142,320	143,504	7,07	7,23	6,92	1,04
30 - 34	208,905	96,046	112,859	5,17	4,88	5,44	0,90
35 - 39	176,372	77,518	98,854	4,36	3,94	4,77	0,83
40 - 44	160,653	71,877	88,776	3,97	3,65	4,28	0,85
45 - 49	141,331	66,230	75,101	3,50	3,37	3,62	0,93
50 - 54	111,797	48,425	63,372	2,77	2,46	3,06	0,80
55 - 59	81,537	37,138	44,399	2,02	1,89	2,14	0,88
60 - 64	84,696	37,534	47,162	2,09	1,91	2,27	0,84
65 - 69	60,418	26,317	34,201	1,50	1,34	1,65	0,81
70 - 74	47,253	23,592	23,661	1,17	1,20	1,14	1,05
75 plus	60,160	32,757	27,403	1,49	1,66	1,32	1,26
	4,041,615	1,967,594	2,074,021	100	100	100	0,95

SOURCE; " Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX 5.

BUJUMBURA CITY

POPULATION

(POPULATION EXTRAPOLATED)

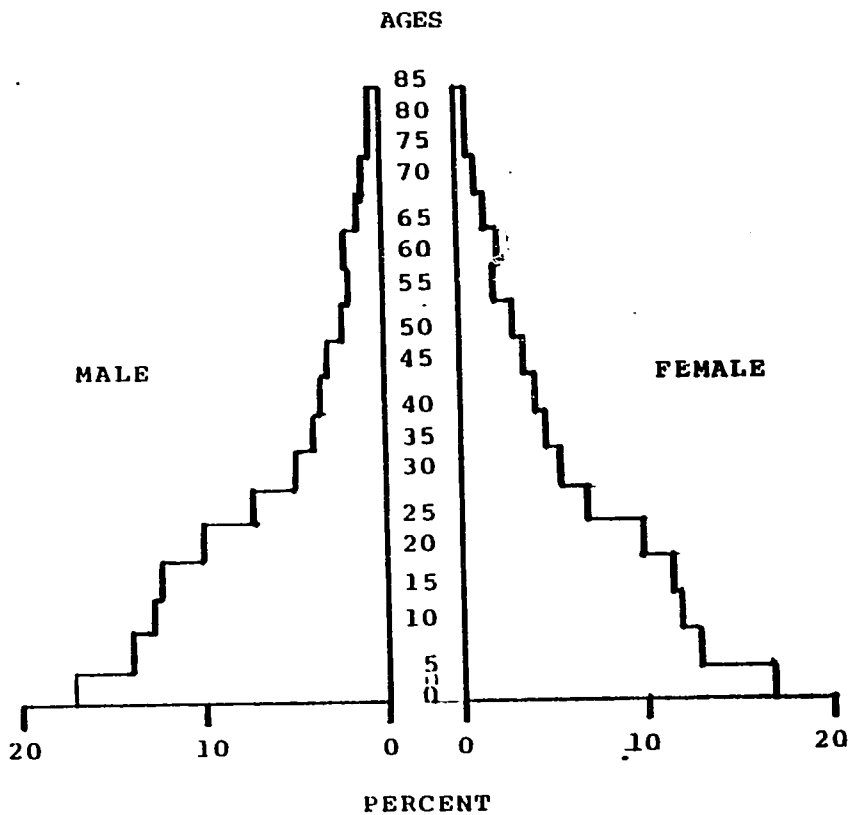
AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	5,462	2,742	2,720
1 - 4	17,500	9,218	8,282
5 - 9	17,830	8,998	8,832
10 - 14	15,341	7,819	7,522
15 - 19	18,942	11,101	7,841
20 - 24	18,072	10,484	7,588
25 - 29	13,634	7,995	5,639
30 - 34	9,758	5,716	4,042
35 - 39	7,115	4,053	3,062
40 - 44	5,441	2,974	2,467
45 - 49	4,306	2,489	1,817
50 - 54	3,161	1,729	1,432
55 - 59	2,070	947	1,123
60 - 64	1,509	683	826
65 - 69	1,278	628	650
70 - 74	495	242	253
75 plus	440	286	154
TOTAL	142,354	78,104	64,250

SOURCE: "Incomplete Raw Data of the Post-Census Survey, 1979"

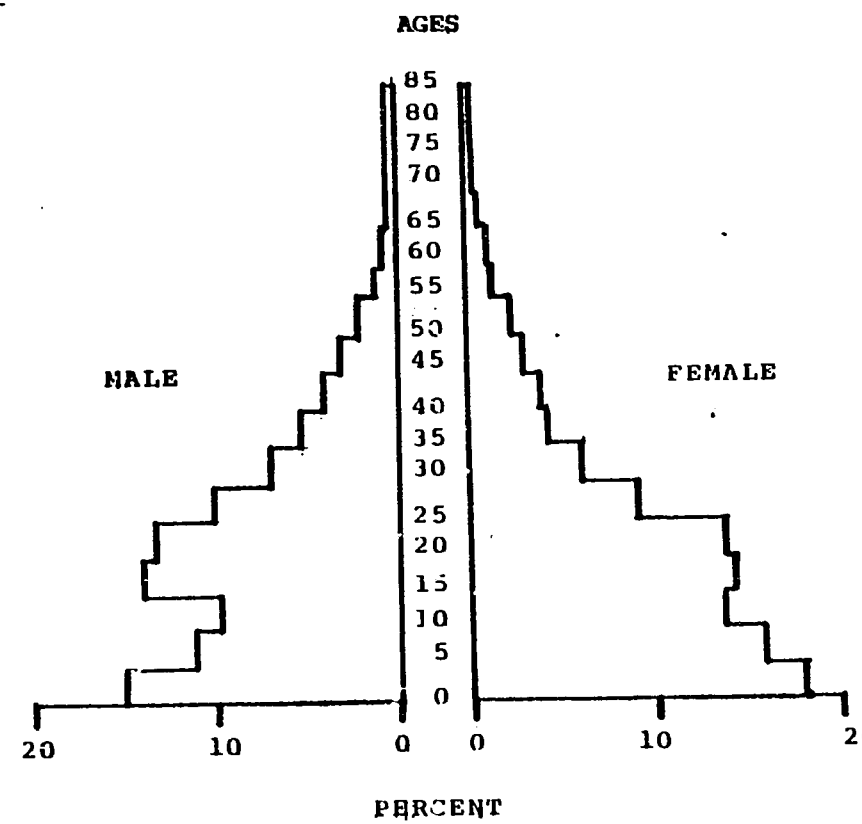
POPULATION PYRAMID

(BY AGE & SEX)

BURUNDI
(WITHOUT BUJUMBURA CITY) 1979



BUJUMBURA CITY



ANNEX 6.

SOURCE: "INCOMPLETE RAW DATA OF THE POST-CENSUS SURVEY, 1979"

ANNEX 7.

BUBANZA PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	15,725	7,742	7,983
1 - 4	46,215	22,807	23,408
5 - 9	45,075	21,787	23,288
10 - 14	37,573	19,147	18,426
15 - 19	35,172	18,006	17,166
20 - 24	33,251	17,646	15,605
25 - 29	25,148	11,944	13,204
30 - 34	17,046	8.883	8,163
35 - 39	16,085	7,982	8,103
40 - 44	13,925	7,023	6,902
45 - 49	10,083	5,221	4,862
50 - 54	9,123	3,661	5,462
55 - 59	5,102	1,981	3,121
60 - 64	6,902	3,361	3,541
65 - 69	3,541	1,320	2,221
70 - 74	2,701	1,501	1,200
75 plus	3,842	2,281	1,561
TOTAL	326,509	162,293	164,216

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX. 8.

BUJUMBURA PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	5,162	2,521	2,641
1 - 4	25,629	12,544	13,085
5 - 9	25,328	12,364	12,964
10 - 14	28,449	15,005	13,444
15 - 19	27,849	14,705	13,144
20 - 24	24,488	13,564	10,924
25 - 29	15,845	8,763	7,082
30 - 34	9,543	4,381	5,162
35 - 39	10,084	4,922	5,162
40 - 44	10,744	5,522	5,222
45 - 49	9,423	5,522	3,901
50 - 54	4,802	2,161	2,641
55 - 59	4,622	1,921	2,701
60 - 64	4,742	2,761	1,981
65 - 69	3,661	1,560	2,101
70 - 74	2,341	1,441	900
75 plus	2,040	1,200	840
TOTAL	214,752	110,857	103,895

Source:"Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX 9

BURURI PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	18,906	9,003	9,903
1 - 4	62,241	31,991	30,250
5 - 9	67,282	33,611	33,671
10 - 14	70,763	36,792	33,971
15 - 19	60,560	29,230	31,330
20 - 24	37,993	18,846	19,147
25 - 29	30,190	14,885	15,305
30 - 34	22,628	9,543	13,085
35 - 39	21,487	8,943	12,544
40 - 44	15,185	6,722	8,463
45 - 49	13,444	6,002	7,442
50 - 54	10,804	4,202	6,602
55 - 59	7,262	3,721	3,541
60 - 64	8,643	3,961	4,682
65 - 69	6,062	2,401	3,661
70 - 74	4,742	2,941	1,801
75 plus	4,982	2,581	2,401
TOTAL	463,174	225,375	237,799

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979"

GITEGA PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	30,310	15,125	15,185
1 - 4	94,051	48,796	45,255
5 - 9	91,831	48,256	43,575
10 - 14	83,908	42,494	41,414
15 - 19	87,089	43,935	43,154
20 - 24	73,464	35,171	38,293
25 - 29	55,458	26,829	28,629
30 - 34	40,693	18,606	22,087
35 - 39	30,070	12,484	17,586
40 - 44	29,470	12,664	16,806
45 - 49	24,728	11,464	13,264
50 - 54	23,708	9,183	14,525
55 - 59	14,645	6,842	7,803
60 - 64	19,086	9,123	9,963
65 - 69	11,944	4,862	7,082
70 - 74	11,464	5,822	5,642
75 plus	13,504	7,322	6,182
TOTAL	735,423	358,978	376,445

SOURCE: "Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX 11.

MURAMVYA PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	12,364	5,762	6,602
1 - 4	41,954	20,407	21,547
5 - 9	47,776	23,708	24,068
10 - 14	50,057	25,329	24,728
15 - 19	50,957	25,268	25,689
20 - 24	38,833	19,026	19,807
25 - 29	25,869	13,985	11,884
30 - 34	18,006	7,923	10,083
35 - 39	17,226	7,203	10,023
40 - 44	16,085	7,862	8,223
45 - 49	15,185	6,122	9,063
50 - 54	12,424	5,762	6,662
55 - 59	8,463	4,021	4,442
60 - 64	5,822	2,821	3,001
65 - 69	6,182	2,521	3,661
70 - 74	4,622	2,341	2,281
75 plus	6,122	3,121	3,001
TOTAL	377,947	183,182	194,765

SOURCE: " Incomplete, Raw Data of the Post-Census Survey, 1979"

ANNEX 12.

MUYINGA PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	24,488	10,864	13,624
1 - 4	76,886	38,233	38,653
5 - 9	80,907	41,114	39,793
10 - 14	63,741	31,150	32,591
15 - 19	63,021	30,310	32,711
20 - 24	57,379	28,149	29,230
25 - 29	36,432	16,565	19,867
30 - 34	27,129	12,484	14,645
35 - 39	23,108	9,543	13,565
40 - 44	21,487	8,163	13,324
45 - 49	21,247	9,483	11,764
50 - 54	15,485	6,062	9,423
55 - 59	15,545	6,782	8,763
60 - 64	12,424	4,621	7,803
65 - 69	8,943	4,201	4,742
70 - 74	6,182	3,001	3,181
75 plus	8,883	4,862	4,021
TOTAL	563,287	265,587	297,700

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979"

NGOZI PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	36,252	18,246	18,006
1 - 4	107,196	51,377	55,819
5 - 9	107,076	51,557	55,519
10 - 14	97,052	47,056	49,996
15 - 19	96,452	46,636	49,816
20 - 24	84,088	37,993	46,095
25 - 29	54,558	27,789	26,769
30 - 34	40,754	17,706	23,048
35 - 39	33,311	14,285	19,026
40 - 44	33,491	14,525	18,966
45 - 49	28,630	13,625	15,005
50 - 54	19,506	10,023	9,483
55 - 59	15,785	7,142	8,643
60 - 64	16,805	6,842	9,963
65 - 69	11,164	4,922	6,242
70 - 74	10,444	4,502	5,942
75 plus	14,465	8,103	6,362
TOTAL	807,029	382,329	424,700

SOURCE; " Incomplete Raw Data of the Post-Census Survey, 1979"

ROYIGI PROVINCE

POPULATION

(POPULATION EXTRAPOLATED)

AGE GROUP	TOTAL	MALE	FEMALE
0 - 0	19,026	10,083	8,943
1 - 4	53,058	26,169	26,889
5 - 9	58,039	31,090	26,949
10 - 14	46,576	22,688	23,888
15 - 19	49,697	25,329	24,368
20 - 24	38,233	18,846	19,387
25 - 29	28,690	13,565	15,125
30 - 34	23,348	10,804	12,544
35 - 39	17,886	8,103	9,783
40 - 44	14,825	6,422	8,403
45 - 49	14,285	6,302	7,983
50 - 54	12,784	5,642	7,142
55 - 59	8,043	3,781	4,262
60 - 64	8,763	3,361	5,402
65 - 69	7,743	3,902	3,841
70 - 74	4,262	1,801	2,461
75 plus	5,882	3,001	2,881
TOTAL	411,140	200,889	210,251

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979"

EXHIBIT A.

BUJUMBURA CITY

POPULATION

TYPE OF DWELLING ACCORDING TO DIFFERENT CHARACTERISTICS OF HOUSING UNIT

(POPULATION EXTRAPOLATED)

DESCRIPTION	CHARACTERISTICS	TYPE		
		MODERN	TRADITIONAL	TOTAL
1. DWELLING	NUMBER HOUSES, HUTS	22,709	936	23,645
2. SHAPE OF DWELLING	SQUARE/RECTANGULAR	22,478	705	23,183
	ROUND	-	-	-
	OTHER	231	231	462
3. WALL MATERIAL	STONE/BRICK	19,141	418	19,559
	MUD	3,491	518	4,009
	REED/BAMBOO	11	-	11
	OTHER	66	-	66
4. ROOF MATERIAL	ETERNIT SHEETING	19,636	110	19,746
	TILE	55	-	55
	STRAW/BANANA LEAF	2,720	749	3,469
	OTHER	298	77	375
5. TYPE OF FLOORING	CEMENT	12,698	33	12,731
	EARTH	9,967	903	10,870
	OTHER	44	-	44
6. TYPE OF LIGHTING	ELECTRICITY	5,330	-	5,330
	OIL/GAS	17,313	936	18,249
	FIREWOOD	66	-	66

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX 15
EXHIBIT B.

TYPE OF DWELLING ACCORDING TO DIFFERENT CHARACTERISTICS OF THE RUGO

DESCRIPTION	CHARACTERISTICS	TYPE		TOTAL
		MODERN	TRADITIONAL	
.1. NUMBER OF	RUGO	12,632	297	12,929
	DWELINGS	66,352	2,026	68,379
	HOUSEHOLDS	25,759	1,189	26,948
	PEOPLE	142,850	5,077	147,927
2. SOURCE OF WATER	RUNNING WATER	3,623	—	3,623
	CAPPED SPRINGS	8,910	165	9,075
	WELLS	55	11	66
	SPRING/RIVER	44	121	165
3. LOCATION OF TOILET	INSIDE	3,436	11	3,447
	OUTSIDE	9,185	286	9,471
	NONE	11	—	11
4. STATUS OF OCCUPANT	OWNER	8,789	253	9,042
	RENTER	3,766	44	3,810
	OTHER	77	—	77

BURUNDI

EXHIBIT A.

(WITHOUT BUJUMBURA CITY)

POPULATION

TYPE OF DWELLING ACCORDING TO DIFFERENT CHARACTERISTICS OF HOUSING UNITS

(POPULATION EXTRAPOLATED)

DESCRIPTION	CHARACTERISTICS	TYPE		TOTAL
		MODERN	TRADITIONAL	
1. DWELLING	NUMBER OF HOUSE, HUTS	104,014	782,481	886,49
2. SHAPE OF DWELLING	SQUARE/RECTANGULAR	97,232	530,697	627,92
	ROUND	6,662	249,803	256,46
	OTHER	120	1,981	2,10
3. WALL MATERIAL	STONE/BRICK	31,150	26,589	57,73
	MUD	61,100	509,690	570,79
	REED/BAMBOO	11,464	221,954	233,41
	OTHER	300	24,248	24,54
4. ROOF MATERIAL	ETERNIT SHEETING	40,393	21,547	61,94
	TILE	22,988	25,028	48,01
	STRAW/BANANA LEAF	39,973	730,984	770,95
	OTHER	660	4,922	5,58
5. TYPE OF FLOORING	CEMENT	15,065	3,601	18,66
	EARTH	87,929	764,715	852,64
	OTHER	1,020	14,165	15,1
6. TYPE OF LIGHTING	ELECTRICITY	420	—	4
	OIL/GAS	64,041	178,320	242,3
	FIREWOOD	39,553	604,161	643,7

ANNEX 16.

EXHIBIT 3.

TYPE OF DWELLING ACCORDING TO DIFFERENT CHARACTERISTICS OF THE RUGO

DESCRIPTION	CHARACTERISTICS	TYPE		TOTAL
		MODERN	TRADITIONAL	
I. NUMBER OF	RUGO	78,086	546,722	624,808
	DWELLINGS	400,513	2,476,185	2,876,698
	HOUSEHOLDS	100,714	775,338	876,052
	PEOPLE	495,345	3,288,196	3,783,541
2. SOURCE OF WATER	RUNNING WATER	16,806	49,636	66,442
	CAPPED SPRINGS	19,746	199,687	219,433
	WELLS	6,062	30,910	36,972
	SPRING/RIVER	35,472	266,489	301,961
3. LOCATION OF TOILET	INSIDE	9,843	10,984	20,827
	OUTSIDE	67,703	526,255	593,958
	NONE	540	9,483	10,023
4. STATUS OF OCCUPANT	OWNER	75,325	545,222	620,547
	RENTER	2,521	720	3,241
	OTHER	240	780	1,020

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979"

ANNEX 17.

EXHIBIT A.

BURUNDI

POPULATION

TYPE OF DWELLING ACCORDING TO DIFFERENT CHARACTERISTICS OF HOUSING UNITS

(POPULATION EXTRAPOLATED)

DESCRIPTION	CHARACTERISTICS	TYPE		TOTAL
		MODERN	TRADITIONAL	
1. DWELLING	NUMBER HOUSES, HUTS	126,723	783,417	910,140
2. SHAPE OF DWELLING	SQUARE/RECTANGULAR	119,710	531,402	651,112
	ROUND	6,662	249,803	256,465
	OTHER	351	2,212	2,563
3. WALL MATERIAL	STONE/BRICK	50,291	27,007	77,298
	MUD	64,591	510,208	574,799
	REED/BAMBOO	11,475	221,954	233,429
	OTHER	366	24,248	24,614
4. ROOF MATERIAL	ETERNIT SHEETING	60,029	21,657	81,686
	TILE	23,043	25,028	48,071
	STRAW/BANANA LEAF	42,693	731,733	774,426
	OTHER	958	4,999	5,957
5. TYPE OF FLOORING	CEMENT	27,763	3,634	31,397
	EARTH	97,896	765,518	863,514
	OTHER	1,064	14,165	15,229
6. TYPE OF LIGHTING	ELECTRICITY	5,750	—	5,75
	OIL/GAS	81,354	179,256	260,61
	FIREWOOD	39,619	604,161	643,78

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979 "

ANNEX 17.
EXHIBIT B.

TYPE OF DWELLING ACCORDING TO DIFFERENT CHARACTERISTICS OF THE RUGO

DESCRIPTION	CHARACTERISTICS	TYPE		TOTAL
		MODERN	TRADITIONAL	
1. NUMBER OF	RUGO	90,718	547,019	637,737
	DWELLINGS	466,866	2,478,211	2,945,077
	HOUSEHOLDS	126,473	776,527	903,000
	PEOPLE	638,195	3,293,273	3,931,468
2. SOURCE OF WATER	RUNNING WATER	20,429	49,636	70,065
	CAPPED SPRINGS	28,656	199,852	228,508
	WELLS	6,117	30,921	37,038
	SPRING/RIVER	35,516	266,610	302,126
3. LOCATION OF TOILET	INSIDE	13,279	10,995	24,274
	OUTSIDE	76,888	526,541	603,429
	NONE	551	9,483	10,034
4. STATUS OF OCCUPANT	OWNER	84,114	545,475	629,589
	RENTER	6,287	764	7,051
	OTHER	317	780	1,097

ANNEX 18.

BURUNDI

(WITHOUT BUJUMBURA CITY)

SUMMARY CHARACTERISTICS

OF HOUSING UNITS AND RUGO

IN %

HOUSING

1. HOUSE TYPE	
a. Traditional	88
b. Modern	12
2. HOUSE SHAPE	
a. Square/Rect.	71
b. Round	28
c. Other	1
3. WALLS	
a. Stone/Brick	7
b. Mud	64
c. Reed/Bamboo	26
d. Other	3
(886,495 HOUSES)	
4. ROOF	
a. Eternit	7
b. Tile	5
c. Straw	87
d. Other	1
5. FLOORING	
a. Cement	2
b. Earth	96
c. Other	2
6. LIGHTING	
a. Electricity	less than 1
b. Oil/gas	26
c. Firewood	73

RUGO

1. SOURCE OF WATER	
a. Running	11
b. Capped spring	35
c. Wells	6
d. Spring/river	48
2. LOCATION OF TOILET	
a. Inside	3
b. Outside	95
c. None	2
3. STATUS OF OCCUPANT	
a. Owner	99
b. Renter	.5
c. Other	.5
(624,808 RUGOS)	

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979 "

BUJUMBURA CITY

SUMMARY CHARACTERISTICS

OF HOUSING UNITS & RUGO *

IN %

HOUSING

1. HOUSE TYPE	
a. Traditional	94
b. Modern	4
2. HOUSE SHAPE	
a. Square/Rect.	98
b. Round	-
c. Other	2
3. WALLS	
a. Stone/Brick	83
b. Mud	17
c. Reed/Bamboo	-
d. Other	-
(23,645 HOUSES)	
4. ROOF	
a. Eternit	84
b. Tile	-
c. Staw	16
d. Other	-
5. FLOORING	
a. Cement	54
b. Earth	46
c. Other	-
6. TYPE OF LIGHTING	
a. Electricity	2
b. Oil/gas	98
c. Firewood	-

RUGO*

1. SOURCE OF WATER	
a. Running	28
b. Capped springs	70
c. Wells	1
d. Spring/river	1
2. LOCATION OF TOILET	
a. Inside	27
b. Outside	72
c. None	1
3. STATUS OF OCCUPANT	
a. Owner	70
b. Renter	29
c. Other	1

*RUGO = PARCELLES
(12,929 PARCELLES)

SOURCE: " Incomplete Raw Data of the Post-Census Survey, 1979 "

CURRICULUM

First Year: Medical Technicians, Sanitary Technicians, and Registered Nurses.

1. Anatomy	ırs/wk.	180 hrs/yr.
2. Biology, Biochemistry, Histology	3 hrs/wk.	108 hrs/yr.
3. Chemistry	1 hr/wk.	36 hrs/yr.
4. Hospital Administration &Civil Instruction	1 hr/wk.	36 hrs/yr.
5. French	4 hrs/wk.	144 hrs/yr.
6. Applied Mathematics	1 hr/wk.	36 hrs/yr.
7. Microbiology	2 hrs/wk.	72 hrs/yr.
8. Nutrition	1 hr/wk.	36 hrs/yr.
9. Parasitology/Entomology	3 hrs/wk.	108 hrs/yr.
10. Psycho-Sociology	1 hr/wk.	36 hrs/yr.
11. Physics	1 hr/wk.	36 hrs/yr.
12. Hygiene/Sanitation	1 hr/wk.	36 hrs/yr.
13. Nursing Care	2 hrs/wk.	72 hrs/yr.
14. Study	8 hrs/wk.	288 hrs/yr.
15. Physiology	4 hrs/wk.	144 hrs/yr.

SOURCE: " Procès-Verbal des Travaux de la Commission Nationale de Réforme des Programmes d'Enseignement dans les Ecoles Paramédicales du Burundi "; République du Burundi, Ministère de la Santé Publique, Enseignement Médical, Avril 12, 1978.

Second Year: Medical Technicians and Registered Nurses only.

1. Epidemiology	2 hrs/wk.	72 hrs/yr.
2. Hygiene and Sanitation	2 hrs/wk.	72 hrs/yr.
3. Normal Obstetrics	2 hrs/wk.	72 hrs/yr.
4. Pharmacology	2 hrs/wk.	72 hrs/yr.
5. Surgical Pathology	3 hrs/wk.	108 hrs/yr.
6. Medical Pathology	4 hrs/wk.	144 hrs/yr.
7. Maternal/Child Health	1 hr/wk.	36 hrs/yr.
8. Puericulture	1 hr/wk.	36 hrs/yr.
9. Health Statistics	1 hr/wk.	36 hrs/yr.
10. Practical	10 hrs/wk.	360 hrs/yr.
11. Nursing Care	2 hrs/wk.	72 hrs/yr.
12. Laboratory Theory & Technique	2 hrs/wk.	72 hrs/yr.
13. Study	3 hrs/wk.	108 hrs/yr.
14. Propedeutic & Semiology	3 hrs/wk.	108 hrs/yr.

Third Year: Medical Technicians and Registered Nurses

1. Health/Nutrition - Education	2 hrs/wk.	72 hrs/yr.
2. Gynecology	2 hrs/wk.	72 hrs/yr.
3. Pathology of Obstetrics	2 hrs/wk.	72 hrs/yr.
4. Surgical Pathology	2 hrs/wk.	72 hrs/yr.
5. Medical Pathology	2 hrs/wk.	72 hrs/yr.
6. Pediatrics	3 hrs/wk.	108 hrs/yr.
7. Pharmacology	2 hrs/wk.	72 hrs/yr.

8. Nursing Care	3 hrs/wk.	108 hrs/yr.
9. Practical incl. Laboratory	15 hrs/wk.	540 hrs/yr.
10. Study	4 hrs/wk.	144 hrs/yr.

First Year: Auxiliary Nurses

1. Administration and Civil Instruction	1 hr/wk.	36 hrs/yr.
2. Anatomy/Biology/Histology	4 hrs/wk.	144 hrs/yr.
3. Entomology	1 hr/wk.	36 hrs/yr.
4. Epidemiology	1 hr/wk.	36 hrs/yr.
5. French	4 hrs/wk.	144 hrs/yr.
6. Hygiene and Sanitation	2 hrs/wk.	72 hrs/yr.
7. Microbiology	1 hr/wk.	36 hrs/yr.
8. Nutrition	2 hrs/wk.	72 hrs/yr.
9. Parasitology	1 hr/wk.	36 hrs/yr.
10. Physiology	3 hrs/wk.	108 hrs/yr.
11. Psycho-sociology	1 hr/wk.	36 hrs/yr.
12. Puericulture	1 hr/wk.	36 hrs/yr.
13. Nursing Care	1 hr/wk.	36 hrs/yr.
14. Study	9 hrs/wk.	324 hrs/yr.

Second Year: Auxiliary Nurses

1. Health Education	2 hrs/wk.	72 hrs/yr.
2. Gynecology	1 hr/wk.	36 hrs/yr.

3. Laboratory	2 hrs/wk.	72 hrs/yr.
4. Normal & Pathological Obstetrics	3 hrs/wk.	108 hrs/yr.
5. Surgical Pathology	2 hrs/wk.	72 hrs/yr.
6. Medical Pathology	3 hrs/wk.	108 hrs/yr.
7. Pediatrics	3 hrs/wk.	108 hrs/yr.
8. Pharmacology	2 hrs/wk.	72 hrs/yr.
9. Maternal/Child Health	1 hr/wk.	36 hrs/yr.
10. Semiology	3 hrs/wk.	108 hrs/yr.
11. Nursing Care	3 hrs/wk.	108 hrs/yr.
12. Practical	10 hrs/wk.	360 hrs/yr.
13. Study	2 hrs/wk.	72 hrs/yr.

Second Year: Sanitary Technicians

1. Provision of Water	4 hrs/wk.	144 hrs/yr.
2. Designs and Plans	4 hrs/wk.	144 hrs/yr.
3. Health Education	2 hrs/wk.	72 hrs/yr.
4. Excretia Disposal	2 hrs/wk.	72 hrs/yr.
5. Epidemiology	2 hrs/wk.	72 hrs/yr.
6. Disposal of Household Waste	2 hrs/wk.	72 hrs/yr.
7. Hydrology/Hydrogeology	2 hrs/wk.	72 hrs/yr.
8. Vector Control	6 hrs/wk.	216 hrs/yr.
9. First Aid	1 hr/wk.	36 hrs/yr.
10. Health Statistics	1 hr/wk.	36 hrs/yr.
11. Topography	4 hrs/wk.	144 hrs/yr.

12. Observation and Practical in the Rural Milieu	5 hrs/wk.	180 hrs/yr.
13. Study, Conferences, Films	4 hrs/wk.	144 hrs/yr.

Third Year: Sanitary Technicians

1. Rural Animation	1 hr/wk.	36 hrs/yr.
2. Chemistry & Bacteriology of Water & Milk	2 hrs/wk.	72 hrs/yr.
3. Climatology	1 hr/wk.	36 hrs/yr.
4. Drainage and Sewers	2 hrs/wk.	72 hrs/yr.
5. Food Hygiene	2 hrs/wk.	72 hrs/yr.
6. Hygiene of Public; Private Places & Placesof Recreation	3 hrs/wk.	108 hrs/yr.
7. Home Hygiene	2 hrs/wk.	72 hrs/yr.
8. Industrial & Work Hygiene	2 hrs/wk.	72 hrs/yr.
9. Laboratory for Water Analysis	3 hrs/wk.	108 hrs/yr.
10. Construction Materials	2 hrs/wk.	72 hrs/yr.
11. Elements Veterinary Medicine	2 hrs/wk	72 hrs/yr.
12. Plumbing	1 hr/wk.	36 hrs/yr.
13. Drafting of Reports	2 hrs/wk.	72 hrs/yr.
14. Practical/Observations	5 hrs/wk.	180 hrs/yr.
15. Study, Conferences, Films	7 hrs/wk.	252 hrs/yr.

First Year: Sanitary Assistants

1. Public Administration and Civil Instruction	1 hr/wk.	36 hrs/yr.
2. Biology/Anatomy/Physiology	2 hrs/wk.	72 hrs/yr.
3. Elementary Chemistry	1 hr/wk.	36 hrs/yr.
4. Elements of Construction Designs/Plans/Topography	3 hrs/wk.	108 hrs/yr.
5. Study	6 hrs/wk.	216 hrs/yr.
6. French	2 hrs/wk.	72 hrs/yr.
7. Food Hygiene	1 hr/wk.	36 hrs/yr.
8. Hygiene	1 hr/wk.	36 hrs/yr.
9. Mathematics	1 hr/wk.	36 hrs/yr.
10. Notions of Physics	1 hr/wk.	36 hrs/yr.
11. Nutrition	1 hr/wk.	36 hrs/yr.
12. Parasitology, Microscopy and Bacteriology	4 hrs/wk.	144 hrs/yr.
13. Practical Work	12 hrs/wk.	432 hrs/yr/

Second Year: Sanitary Assistants

1. Provision of Water	2 hrs/wk.	72 hrs/yr.
2. Drainage and Sewers	2 hrs/wk.	72 hrs/yr.
3. Health Education	2 hrs/wk.	72 hrs/yr.
4. Epidemiology	3 hrs/wk.	108 hrs/yr.
5. Excretia Disposal	2 hrs/wk.	72 hrs/yr.

6. Disposal of Household Waste	3 hrs/wk.	108 hrs/yr.
7. Study	4 hrs/wk.	144 hrs/yr.
8. Hygiene of Homes and Public Places	2 hrs/wk.	72 hrs/yr.
9. Vector Control	6 hrs/wk.	216 hrs/yr.
10. Drafting of Reports	2 hrs/wk.	72 hrs/yr.
11. Emergency Care/First Aid	2 hrs/wk.	72 hrs/yr.
12. Practical	10 hrs/wk.	360 hrs/yr.

IV,B,2

HOME VISIT REPORT-CARITAS

.....QUARTER:MONTH.....

HEALTH CENTER.....DIOCESE.....

I. FAMILY SITUATION

- NUMBER OF FAMILIES VISITED.....
- NUMBER OF FAMILIES WITH LEGAL MARRIAGES .....
- NUMBER OF FAMILIES WITH ILLEGAL MARRIAGES .....
- NUMBER OF WIDOWERS OR WIDOWS .....
- NUMBER OF ELDERLY .....
- NUMBER OF CHILD - MOTHERS .....
- NUMBER OF SINGLE ADULTS .....
- NUMBER OF YOUNG CHILDREN .....
  - . INFANTS 0 - 2 YEARS: .....
  - . PRESCHOOLERS 3 - 6 YEARS: .....
  - . SCHOOL AGE 6 - 14 YEARS: .....DEATHS:.....
- NUMBER OF PHYSICALLY HANDICAPPED .....
- NUMBER OF MENTALLY HANDICAPPED .....
- MOST FREQUENT FAMILY CONFLICTS .....
  - . COMMUNICATIONS: RADIO

    SUSCRIPTION
- NUMBER OF FAMILIES W/RADIOS .....
- NEWSPAPER SUBSCRIPTIONS: NDONGOZI .....

  UBUMWE .....

LE RENOUVEAU .....

OTHER .....

II. ECONOMIC SITUATION

SOURCE OF FAMILY REVENUE:.....

a) AGRICULTURE: (TYPES OF CROPS)

1) FOOD CROPS: TYPE .....

-DAILY CONSUMPTION .....

2) TRUCK-GARDENS, TYPES OF VEGETABLES? .....

- HOW MANY FAMILIES HAVE A KITCHEN GARDEN?.....

3) FRUIT - HOW MANY FRUIT TREES? .....

- TYPE: .....

-HOW IS THE FARMER IMPROVING HIS METHODS? .....

4) CASH CROPS : COFFEE

TEA

- HOW IS MONEY FROM CASH CROPS USED? .....

b) ANIMAL RAISING: (TYPE AND # OF FAMILIES)

- CATTLE

- SMALL ANIMALS

- UTILIZATION

- # OF FAMILIES WITH A COW SHED .....

c) COTTAGE INDUSTRY ETC:

- HOW MANY FAMILIES PRACTICE:.....

. CRAFTS .....

. BLACKSMITH .....

. CARPENTRY .....

. ROPE MAKING .....BASKETS.....ETC.....

III. HEALTH SANITARY CONDITIONS

. THE POPULATION SUFFERS FROM WHICH DISEASES? .....

. CAUSES OF DISEASES .....

.NUMBER OF CASES OF KWASHIORIKOR .....

ADULT.....CHILDREN .....

. IN YOUR REGION, WHAT ARE MAJOR OBSTACLES TO IMPROVEMENT OF HEALTH?

- CUSTOM .....

EXAMPLES: .....

- PROHIBITIONS .....

- TABOOS .....

. DEGREE OF PERSONAL HYGIENE, CLOTHING, HOME .....

. WHERE DOES FAMILY OBTAIN WATER? .....

. CAUSES OF INFANT MORTALITY .....

. ARE THERE TRADITIONAL DOCTORS, MIDWIVES? .....

.NUMBER OF HOUSES CONSTRUCTED OF DURABLE MATERIALS (STONE - BRICKS)

.....

. NUMBER OF TIN ROOFS .....

. NUMBER OF TILE ROOFS .....

. NUMBER OF HOUSES CONSTRUCTED OF SEMI-DURABLE MATERIALS (SUN-DRIED BRICKS, CLAY) .....

. NUMBER OF TWO STORY HOUSES .....

. NUMBER OF HUTS .....

. NUMBER OF FAMILIES WITH GOOD LATRINES .....

. NUMBER OF FAMILIES WITH 1 - 3 COMPOST PILES .....

. NUMBER OF FAMILIES WITH SEPARATE BUILDING FOR LIVESTOCK

.....

. NUMBER OF FAMILIES WITH OUTDOOR KITCHEN .....

. NUMBER OF FAMILIES WITH INDOOR KITCHEN, OVEN .....

IV. EVALUATION OF HOME VISITS

. GOAL AIMED FOR AND ACHIEVED:

- .....
- .....
- .....
- .....

NON-ACHIEVED .....

- .....
- .....

. WHAT ACTIVITIES HAVE YOU DONE DURING THESE VISITS?

.....

. WHAT ADVICE HAVE YOU GIVEN DURING THESE VISITS?

.....

. WHAT IMPROVEMENTS HAVE YOU NOTICED? .....

. AT THE HOMES OF VISITE FAMILIES .....

. HAVE THE WOMEN PUT INTO PRACTICE THE NUTRITIONAL EDUCATION RECEIVED AT THE CENTER? HOW? .....

. TO YOUR PRESENCE? .....

. PROBLEMS, DURING VISITS: .....

V. SUGGESTIONS FOR HOME VISITS

N.B. THIS REPORT IS COMPLITED BY ANIMATRICE.

SIGNATURE OF ANIMATRICE:

SIGNATURE OF SUPERVISOR:

SOURCE: CARITAS

Ch. IV, B, 1 NUTRITION/FOOD PRODUCTION

YIELD LEVELS 1959* and 1979 Kg/ha

	1959	1979	% DECLINE
Beans	750	650	15
Maize	1,000	800	20
Rice	3,500	2,500	28
Sorghum	1,200	550	54
Millet	600	450	25
Wheat	750	500	33
Peas	800	350	56
Peanuts	600	500	17
Cassava	13,000	7,500	43
Sweet Potatoes	7,500	4,000	47
Irish Potatoes	7,000	5,000	29

* P. Leurqoin: Chang in Ruanda-Urundi 1945-60.

ANNEX 23.

THE TABLE BELOW IS BASED ON REPORTS MADE TO THE EPIDEMIOLOGICAL SERVICES, MINISTRY OF PUBLIC HEALTH IN 1979.

REPORTABLE DISEASES, BURUNDI, 1979.

CAUSES	NUMBER OF CASES REPORTED, 1979	NUMBER OF DEATHS	LETHALITY (DEATHS PER 1000 CASES)
SEVERE DIARRHEAS	18,040	24	1.33
INFLUENZA	71,845	3	0.04
MALARIA	88,338	57	0.65
MEASLES	49,601	450	9.07
CHICKEN POX	9,717	0	0.00
WHOOPING COUGH	4,968	14	2.82
CHOLERA	763	35	45.87
EPIDEMIC TYPHUS ~~LOUSE~~ BOURNE	341	11	32.25
DIPHTERIA	15	2	13.33
TETANUS	168	62	36.9
MENINGITIS	46	14	30.43
POLIO	29	1	3.45

ANNEX 24.

THE NINE PRINCIPLE CAUSES OF HOSPITALIZATION

1978 - 1979

SOURCE: MINISTRY OF HEALTH, BURUNDI

CAUSES	NUMBER OF CASES 1978	NUMBER OF CASES 1979	TOTAL (2YEARS)	RANK	COMMENTS BY AUTHOR
SEVERE DIRRHEAS	223,444	19,146	242,590	1	Influence of cholera epidemic 1978 on reporting.
INFLUENZA	83,443	91,268	174,711	2	"Influenza" probably includ a variety of pulmonary infection
MALARIA	84,690	64,563	149,253	3	Includes only severe or complicated cases. Real incidence probably ten-fold
MEASLES	49,629	41,916	91,545	4	Severe or complicated cases only. Real incidance probab 5 fold.
CHICKEN POX	12,617	11,113	34,843	5	Lethality given as zero.
WHOOPING COUGH	9,966	5,336	15,302	6	Lethality reported as 4 per 1000 cases
CHOLERA	7,703	915	8,618	7	Lethality reported as 24 per 1000 cases
TYPHUS	1,010	NONE REPORTED	1,010	8	Type not given. Lethality reported as 12 per 1000 ca
PULMONARY TUBERCULOSIS	NONE REPORTED	431	431	9	Obviously under reported

ANNEX 25.

BURUNDI: DEATH RATES, 1976

AS PERCENT OF DEATES BY AGE

SOURCE: WEISLER: " ETUDE SUR QUELQUE PARAMETRES DEMOGRAPHIQUES ET SANITAIRES AU BURUNDI ", JUNE1976

DISEASES BY CATEGORIES	AGE GROUPS IN YEARS						
	0 - 1	2 - 4	5 - 14	15 - 24	25 - 34	35 - 44	45 AND OVER
a) INFECTIOUS AND PARASITICAL DISEASES. INCLUDES MEASLES WHOOPING COUGH MALARIA TUBERCULOSIS TYPHUS HEPATITIS	22	47	40	37	37	33	33
b) MALNUTRITION	5	28	20	2	3	7	4
c) PNEUMONIA	10	11	13	4	6	6	14
d) GASTROENTERITIS	11	7	2	1	0	0	0
e) OTHER DISEASES INCLUDES CIRRHOSIS OF THE LIVER ALCOHOLISM TRYPANOSOMIASIS SCHISTOSOMIASIS AND ALL OTHERS	52	7	25	53	54	54	49
TOTALS (IN PERCENT)	100	100	100	97	100	100	100

PROJECT FOR MALARIA STUDY - BURUNDI.

Belgian assisted malaria study.

Summary

Mission d'assainissement de la Plaine de la Ruzizi (MAPR) begins - June 1981 - Dr Marc GOOSEMANS has arrived.

Objectives

1. Evaluate the endemic level and delineate the malarious zones in a way that will permit the development of a plan of action for a region of the Plain of Ruzizi that is in full agricultural development.
2. Establish at Bujumbura a referance laboratory for malaria, capable of information concerning the parasitology, entomology, immunolology, as well as the sensitivity of the parasites to anti-malaria agents.
3. The laboratory will become the center for the training of specialized personnel.

Local

The Plain of Ruzizi, which is a part of the natural region of the Imbo is limited on the north by the Burundi border with Rwanda, on the south by Lake Tanganika, to the west by the Ruzizi River and in the east by a ridge line of 1000 meters, the altitude of the plain is between 780 and 1000 meters. It has at certain points a width of 10 km. There are three tarraces crossing from west to east corresponding to old river beds of the Ruzizi. Its surface is about 80,000 hectares. which comprises about 56% of the region of Imbo.

Climate

800 to 1100 mm average annual rainfall, with marked variations.

Temperature: 24° C (average)
variation 16.1° C - 32.3° C

Seasons

- Great dry season: mid-may to mid-October
- Small rainy season: November and December
- Small dry season: January and early February
- Great rainy season: later February to mid-May

Population

120,000 (109,2/km^2); 1.03/one ratio masculine/feminine and recent important growth of population. 47% of population is less than 15 years. School attendance 22.6%.
People live in rugos of several houses; with an average of 5.9 persons/rugo and 4 hectares/rugo.

Agriculture

Cotton, corn, soya, beans, manioc, bananas and rice. Important areas of irrigation, particularly rice cultural.

History

Until 1950, development and exploitation of this area was impeded by tick-bourne relapsing fever, trypanosomiasis (trypanosomiasel and malaria. The area was known as the valley of death. After 20 years of work, relapsing fever and sleeping sickness have essentially disappeared. Malaria however, persists and irrigated farming has caused a proliferation of mosquitos. Schistosomiasis is also widespread.

Health infra-structure

There are six dispensaries on the road between Bujumbura and Rugombo (80 km). The MAPR with Belgian assistance has been conducting measures against cholera, schistosomiasis and malaria using mobile teams and integrated action at the dispensaries: measures against malaria have included domiciliary residual spraying, anti-larval measures and chemoprophylapis. Since 1970, these anti-malaria actions have been linited to episodal administration of anti-malaria drugs to the most susceptible populations. Attempts

to integrate these activities with other health services have been ineffective. These control actions unfortunately have been episodal and insufficiently control, without adequate supervision. On the other hand, results are impossible to evaluate because of the lack of any base line survey data. The dispensaries do not have the laboratories or the trained personnel to conduct a study of the specific problem.

THE NEW PROJECT FOR STUDY OF THE MALARIA PROBLEM.

Since 1978, the Institute of Tropical Medicine at Anvers has been conducting an annual refresher course of 8 weeks in tropical medicine for recently graduated Burundians doctors. Starting in January 1981, Mr. Marc Goosens is assistant at this Institute will be assigned to the hygiene laboratory at Bujumbura under the supervision and logistic support of the laboratory of protozology of the Anvers Institute of Tropical Medicine.

Means available to carry out the Project

An embryo laboratory of parasitology exists at the service of hygiene. It is planned that the malaria laboratory will be created there. Laboratory workers and field personnel will be chosen by personnel of MAPR. Operating expenses will be furnished by the Belgian Tropical Medicine Funds. W H O will furnish:

a. Short term experts for evaluation and study of feasibility.

b. Equipment for the referenced laboratory including:
   binocular microscopes, dissecting microscopes, material for electrophoresis of isoenzymes and material for statistical analysis.

c. Kits for determining resistance (anophelline and plasmodial)

d. Scientific and didactic reference material.

e. Specialized study tours for one or two members of the laboratory personnel.

Description of the project

The project for malaria control will be based on information from:
a. Reconnaissance to delimit the malarious zone by geographic epidemiological methods (estimation of prevalence and incidence of malaria)
b. Longitudinal study to determine the climatic and ecological factors seasonal or otherwise that influence the intensity of transmission.
c. Seasonal movements of the population - migration of workers to regions less infected and into areas of high transmission.

Notes

1. The limitation of malaria zones in Burundi have been described by various authours but these are only quick, one time studies based on available epidemicological information from fixed health units.
2. In recent years increased interest in agricultural development and increased density of population in the valley of the Ruzizi has substantially modified the epidemiological profile of malaria in this region.

Objectives

The research work proposes:
a. Longitudinal study in 2 representative areas of the Ruzizi valley.

Protocole

1. Entomology study: 2 areas, night captures of man-biting mosquitoes (once each week). Capture of other mosquitoes (twice each month).
Objective: to determine density of different species, bite rates and rythm of man-biting, mode of transmission (endophilic or exophilic, endophagic or exophagic) seasonal variations and different parameters.

2. Parasitology study - 2 areas

Longitudinal study (once every 2 months) of preschool and primary school children, a stratified sample of the adult population and of workers entering from non malarious areas; using thick and thin blood smear techniques.

Objective

To determine the plasmodia species, the parasite index, gamatocyte infection rate, total incidence, rate of stablility, etc. and the variation of these parameters by age, seasons and perhaps other factors.

3. Immunological studies

Immuno-fluorescence, anti-bodies against sporozoctes.

Objective: to define in combination with the parasitology studies the notion and extent of acquired immunity.

4. Sensitivity tests.

a. A test of sensitivity of the vectors to the insecticides.

b. A test of P. falciparum response to chloroquine in vitro and in vivo methods.

Supplementary comment

According to Dr. Storm and Mr. Goosemans, the Belgians plan to establish similar studies in the plain areas and the Valley of the Ruzizi for Schistosomiasis - to begin probably at the end of 1981. Details of this study are not available at this time, but overall objectives are similar to those for malaria.

RANKING OF COMMUNICABLE DISEASES, BURUNDI, 1979

ACCORDING TO THE FREQUENCY (MORBIDITY) AND NUMBER OF DEATHS (MORTALITY)

SOURCES: (a) MIN. OF HEALTH HOSPITAL REPORTS, (b) EPIDEMIOLOGICAL REPORTS, (c) INTERVIEWS WITH LOCAL HEALTH OFFICERS

DISEASES	HOSPITAL REPORTS		EPIDEM. REPORTS		HEALTH OFFICER INTERVIEW (6 only) (by ecological areas)					
					WESTERN PLAINS		CENTRAL HIGHLANDS		EASTERN AREA	
	MORB.	MORT.	MORB.	MORT.	MORB.	MORT.	MORB.	MORT.	MORB.	MORT.
INFLUENZA PNEUMONIA SERIOUS RESPIRATORY	1	NOT GIVEN	2	6	4	4	1	1	3	4
MALARIA	2	"	1	3	2	2	6	6	2	2
MEASLES	3	"	3	1	1	1	2	2	1	1
DIARRHEAS	4	"	4	5	3	3	3	4	4	3
CHICKEN POX	5	"	5	0	5	–	4	–	5	–
WHOOPING COUGH	6	"	6	7	6	5	5	3	6	5
CHOLERA	7	"	7	4	–	6	–	5	–	–
TYPHUS	0	"	8	9	–	–	–	–	–	–
TETANUS	–	"	9	2	–	–	–	–	–	–
MENINGITIS	–	"	10	8	–	–	–	–	–	–
POLIO	–	"	11	10	–	–	–	–	–	–
DIPHTERIA	–	"	12	9	–	–	–	–	–	–
TUBERCULOSIS	8	"	NOT REPORTED	NOT REPORTED	–	–	–	–	–	–

ANNEX 28.

National Office of Pharmaceuticals

(ONAPHA)

Planned Production of Essential Drugs

In 1981

DRUG	UNIT	PLANNED PRODUCTION 1981
Aspirin	500 mg Tabs.	9,000,000
Chloroquine	100 mg Tabs.	9,000,000
Mebendazole ("Vermox")	100 mg Tabs.	6,000,000
Rehydration Powder	Kg	2,000
Ampicillin	250 mg Caps.	750,000
Chloramphenicol	250 mg Caps.	1,750,000
Tetracycline	250 mg Caps.	1,750,000

ANNEX 29.

EXHIBIT A.

BASES FOR ESTIMATING INCIDENCE OF DIARRHEAS (CHILDREN 1-14 yrs, ONLY)

AGE GROUP	APPROX. POP. AT RISK	EST. INFECTION RATE %	ANNUAL NO CASES (APPROX.)
1 - 4 yrs	500,000	45	225,00
5 - 14 yrs	1,000,000	50	50,000
TOTAL 1 - 14 yrs	1,500,000		275,000

(1) Excludes Bujumbura, where piped central water system protects against diarrheas.

ANNEX 29.

EXHIBIT B.

BASES FOR ESTIMATING INCIDENCE OF MALARIA

AGE GROUP	% TOTAL POP. INCLUDES BUJUMBURA	POP AT RISK % POP x 1 MIL.	ESTIMATED INFECTION RATE	ANNUAL NO CASES
1 thru 4	$\frac{524,730}{4,041,615} = 13,0$	130,000	50%	65,00
4 thru 9	$\frac{541,144}{4,041,615} = 13,4$	134,000	30%	40,168
10 thru 14	$\frac{493,460}{4,041,615} = 12,2$	122,000	25%	30,524
15 thru 29.	$\frac{1,181,364}{4,041,615} = 29,0$	290,000	20%	58,460
30 and over	32,4	324,000	15%	48,600
TOTALS	100	1000,000		242,752

ANNEX 29.

EXHIBIT C.

MEASLES: BURUNDI

ESTIMATED INCIDENCE (ANNUAL)

AGE GROUP	NUMBER CHILDREN	ESTIMATED RATE % INFECTION	EXPECTED ANNUAL NO OF CASES
0 thru 12 months,	167,168	10%	16,717
13 thru 24 months	157,881	70%	110,517
25 thru 36 months	152,305	10%	15,230
37 thru 48 months,	148,594	5%	7,430
49 thru 60 months	139,306	5%	6,965
TOTALS		100%	156,859

Assumptions:

Births in 1981 estimated as 185,742

BASIS: a) 1979 Census Total for whole country, 4,041,615

b) Annual growth rate: 2.2%

c) Annual birth rate: 4.4%

d) Estimated service rates of newborns 1981:

To 12 months : 90%

To 24 months : 85%

To 36 months : 83%

To 48 months : 80%

To 60 months : 75%

ANNEX 29.

EXHIBIT D.

WHOOPING COUGH (BURUNDI)

ESTIMATED ANNUAL INCIDENCE

COHORT AGE GROUP (MOS)	SURVIVING NO CHILDREN	EST. RATE (%)	EST. NO CASES
0 - 12	167,168	20%	33,434
13 - 24	157,881	20%	31,576
25 - 36	152,305	10%	15,230
37 - 48	148,594	5%	7,430
49 - 60	139,306	5%	6,965
TOTALS		TOTAL	94,635

Assumptions:

Same as for estimation of incidence of measles (see Table)

"INFLUENZA" BURUNDI

ESTIMATED ANNUAL INCIDENCE

AGE GROUP (YRS)	POPULATION	EST. RATE %	EST. NO CASES
0 - 4	692,425	5%	34,621
5 - 14	1,034,604	10%	103,460
15 - 34	1,390,269	15%	208,540
Over 34	924,317	30%	277,295
TOTALS	4,041,615	60%	623,916

"Influenza" in Burundi includes true influenza plus a variety of non-specified viral infections, grippe, arbo-virus infections et al, which require treatment.

ANNEX 29.

EXHIBIT E.

PNEUMONIA (BURUNDI)

ESTIMATED ANNUAL INCIDENCE

(as complication of primary disease)

PRIMARY DISEASE	NUMBER EST. PRIMARY DISEASE	PNC RATE (%) AS COMPLICATION	EST. CASES PNEUMONIA
MEASLES	156,859	10	15,686
WHOOPING COUGH	94,635	15	14,195
MALNUTRITION (20% of 1 - 4 age group which is 524,730)	104,946	30	31,484
"INFLUENZA"	623,916	5	31,196
	TOTAL EST. CASES		92,561

ANNEX 29.

EXHIBIT F.

ESTIMATED PREVALENCE

INTESTINAL PARASITISM BURUNDI

EXCLUSING BUJUMBURA

AGE GROUP	POPULATION	EST.RATE (%) INFESTATION	EST. NO CASES
1 - 4	507,230	20	101,446
5 - 14	478,119	40	191,248
15 - 29	1,130,716	30	339,215
30 and over	1,783,196	15	267,479
TOTALS	3,899,261	23	899,388

*Estimate is conservative based on typical findings from stool examinations at laboratories in rural hospital areas. Actual infection rates may be substantially higher since hospital service population is more urban or semi-urban than overall rural population of Burundi.

ANNEX 29.

EXHIBIT G.

ONE CASE TREATMENT COST (DRUGS ONLY)

FOR COMMON COMMUNICABLE DISEASES - BURUNDI

SOURCE: PRICE LIST OF ESSENTIAL DRUGS,
OFFICE NATIONAL DES PHARMACEUTIQUES (ONAPHA)

EXCHANGE RATE: $1.00 U.S.= 89.55 FBU (for estimation 1/100)

DISEASE	TREATMENT REGIME	DRUG COST ONE CASE FBU	BASIS FOR COST FBU
DIARRHEA	(a) 90% of all cases: one unit Hydration powder (b) 5% of all cases: 3 units hyd. powder (c) 5% of all cases: 3 units hyd. powder + 20 caps chloramphenicol	(a) 33 (b) 99 (c) 225	(a) one unit hyd. powder (27.5 gms = 33 (b) a x 3 = 99 (c) Chloramphenicol 250 mg cap. at 6.312 FBU x 20= 126.24 plus (a) x 3= 99.00 Total =225.00
MALARIA	Aspirin 10 tabs plus chloroquine 100 mg 20 tabs	46	Aspirin 500 mg ab. at 0.945 x 10 = 9.45 chloroquine 100 mg at 1.833 x 20 = 36.66 Total = 46.11
MEASLES	(a) 40% of cases: aspirin 10 tabs only (b) 50% of cases: aspirin 10 tabs + cough mixt. (c) 10% of cases: aspirin + cough mixt. + antibiotic	(a) 10 (b) 60 (c) 195	(a) aspirin 500 mg tab. at 0.945 x 10 = 9.45 (b) aspirin (a) + syrup pectoral 100 1 at 50 = 59.45 (c) aspirin (a) + syrup pectoral (b) + chloramphenicol 250 mg at 6.312 x 20 =195.14
WHOOPING COUGH	(a) 50% of cases: 20 aspirin + cough mixt 100 ml (b) 50% of cases chloramphenicol 20 caps + cough mixt. 100 ml	(a) 69 (b) 176	(a) aspirin 500 mg tabs at 0.945 x 20 = 19 + syrup pect. 100 ml at 50 (b) chloramphenicol 250 mg at 6.312 x 20 = 126.24 syrup pect. 100 ml at 50 = 50.00 Total = 176.24

DISEASE	TREATMENT REGIME	DRUG COST ONE CASE FBU	BASIC FOR COST FBU
INFLUENZA	(a) 50% of cases: 20 Aspirin (or Anti-grippe tabs)	(a) 19	(a) Aspirin 500 mg tabs at 0.945 x 20 = 19
	(b) 40% of cases: 20 Aspirin + cough mixt.	(b) 69	(b) Aspirin 20 = 19 + 100 ml Syrup pect. at 50 Total = 69
	(c) 10% of cases: 20 Aspirin + Tetracycline 20 caps	(c) 111	(c) Aspirin 20 = 19 Tetracycline 250 mg caps at 4.598 x 20 = 91.96 Total = 110.96
PNEUMONIA	(a) 40% of cases: Tetracycline 50 caps	(a) 230	(a) Tetracycline 250 mg caps at 4.598 x 50 = 229.9
	(b) 60% of cases: Chloramphenicol 50 caps	(b) 316	(b) Chloramphenicol 250 mg caps at 6.312 x 50 = 315.6
INTESTINAL PARASITES	(a) 1 - 4 yrs old 40% of cases: Vermox Mebendazole 3 tabs	(a) 11	(a) Mebendazole tabs 3.519 x 3 = 10.557
	(b) Over 4 yrs 60% of cases: Mebendazole 6 tabs	(b) 22	(b) Mebendazole tabs 3.519 x 6 = 21.114

ANNEX 29.

EXHIBIT H.

ESTIMATION OF ANNUAL COST OF DRUGS TO TREAT THE SEVEN MOST COMMON DISEASES IN BURUNDI

Conversion rate 1.00 US$ = 89.55 FBU (approx. 1/100)

DISEASE	ESTIMATED NO. TREATMENT NEEDED	COST/ TREATMENT (FBU)	ANNUAL DRUG COST FBU
DIARRHEA (Total estimated cases 275,000 annually)	(a) 90%: One Hydration Powder Unit 247,500	(a) 33	(a) (8,169,500)
	(b) 5%: 3 Hyd. Powder Units 13,750	(b) 99	(b) (1,361,250)
	(c) 5%: 3 Hyd. Powder Units + chloramphenicol 13,750	(c) 225	(c) (3,093,750)
		SUBTOTAL FOR DIARRHEA =	12,624,500
MEASLES (Total estimated annual cases: 156,8591	(a) 40% of cases: Aspirin only 62,744	(a) 10	(a) (627,440)
	(b) 50% of cases Aspirin + Cough Mixt 78,429	(b) 60	(b) (4,705,740)
	(c) 10% of cases Aspirin +Cough Mixt + Antibiotic 15,686	(c) 195	(c) (3,058,770)
		SUBTOTAL FOR MEASLES =	8,391,950
MALARIA	242,752	46	11,166,592

DISEASE	ESTIMATED NO. TREATMENT NEEDED	COST/ TREATMENT (FBU)	ANNUAL DRUG COST FBU
WHOOPING COUGH (Estimated total annual cases: 94,636)	(a) 50% of cases Aspirin +Cough Mixt. 43,318 (b) 50% of cases Cough Mixt. + Antibiotic 47,318	(a) 69 (b) 176	(a) (3,264,942) (b) (8,327,880)
	SUBTOTAL FOR WHOOPING C.		= 11,592,822
INFLUENZA (Estimated total annual cases: 623,916	(a) 50% of cases Aspirin only 311,958 (b) 40% of cases Aspirin + Cough.Mixt. 249,566 (c) 10% of cases Aspirin +Cough Mixt. + Antibiotic 62,392	(a) 19 (b) 69 (c) 111	(a) (5,927,202) (b) (17,220,054) (c) (6,925,512)
	SUBTOTAL FOR INFLUENZA		= 30,072,768
PNEUMONIA as complication of: a. Measles 156,859 cases b. Whooping cough 94,635 cases c. Malnutrition 104,946 cases d. Influenza 623,916 cases	Antibiotics (a) 15,686 (b) 14,195 (c) 31,484 (d) 31,196	Weighted average cost using different drugs is 282	(a) (4,423,452) (b) (4,002,990) (c) (8,878,488) (d) (8,797,272)
	SUBTOTAL FOR PNEUMONIA		= 26,102,202

DISEASE	ESTIMATED NO. TREATMENT NEEDED	COST/ TREATMENT (FBU)	ANNUAL DRUG COST FBU
INTESTINAL PARASITES (Ascaris, Trichuris Hookworm Strongyloides et al)	2 treatments per year		
(a) 1-4 yrs olds 20%: 101,446 cases	(a) 202,892	(a) 11	(a) (2,231,812)
(b) 5-12 yrs olds 40%: 191,248 cases	(b) 382,496	(b) 22	(b) (8,414,912)
(c) 15-29 yrs olds, 30%: 339,215 cases	(c) 678,430	(c) 22	(c) (14,925,460)
(d) 30 yrs & older 15%: 267,479 cases	(d) 534,958	(d) 22	(d) (11,769,076)
		SUBTOTAL INTESTINAL PARASITES	= 37,341,260
		GRAND TOTAL IN FBU (rounded of last 2 digits)	137,292,200
		EQUIVALENT IN US $	= 1,533,13[illegible]

ANNEX 30.
EXHIBIT B.

ESTIMATED RECURRENT COST OF OPERATING THE NEW RURAL HEALTH INFRA-STRUCTURE, PROPOSED BY THE MERCENIER HEALTH PLANNING WORK GROUP.

CALENDER YEAR	NUMBER OF HEALTH CENTERS	OPERATING COST AT 737,300 FBU EACH	NUMBER OF HOSPITALS	OPERATING COST AT 7,800,000 FBU EACH	TOTAL FBU	TOTAL EQUIVALENT US $ at 1.00=89.55 FBU
1979	3	2,211,900	1	7,800,000	10,011,900	111,803
1980	6	4,423,800	1	7,800,000	12,223,800	136,502
1981	14	10,322,200	3	23,400,000	33,722,200	376,574
1982	30	22,119,000	5	39,000,000	61,119,000	682,513
1983	54	39,814,200	8	62,400,000	102,214,200	1,141,420
1984	88	64,882,400	11	85,800,000	150,682,400	1,682,662
1985	130	95,849,000	14	109,200,000	205,049,000	2,289,771
1986	175	129,027,500	17	132,600,000	261,627,500	2,921,580
1987	226	166,629,800	21	163,800,000	330,429,800	3,689,892
1988	272	200,545,600	21	163,800,000	364,345,600	4,068,627
1989	305	225,613,800	21	163,800,000	389,413,800	4,348,563
1990	328	241,834,400	21	163,800,000	405,634,400	4,529,697
1991	336	247,732,800	21	163,800,000	411,532,800	4,595,564
TOTAL		1,451,006,400		1,287,000,000	2,738,006,400	30,575,168