

THE REPUBLIC OF RWANDA

THE STUDY
ON
THE RURAL WATER SUPPLY PROJECT
IN
THE EASTERN REGION (PHASE III)

FINAL REPORT
VOLUME III : SUPPORTING REPORT

JANUARY 1992

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

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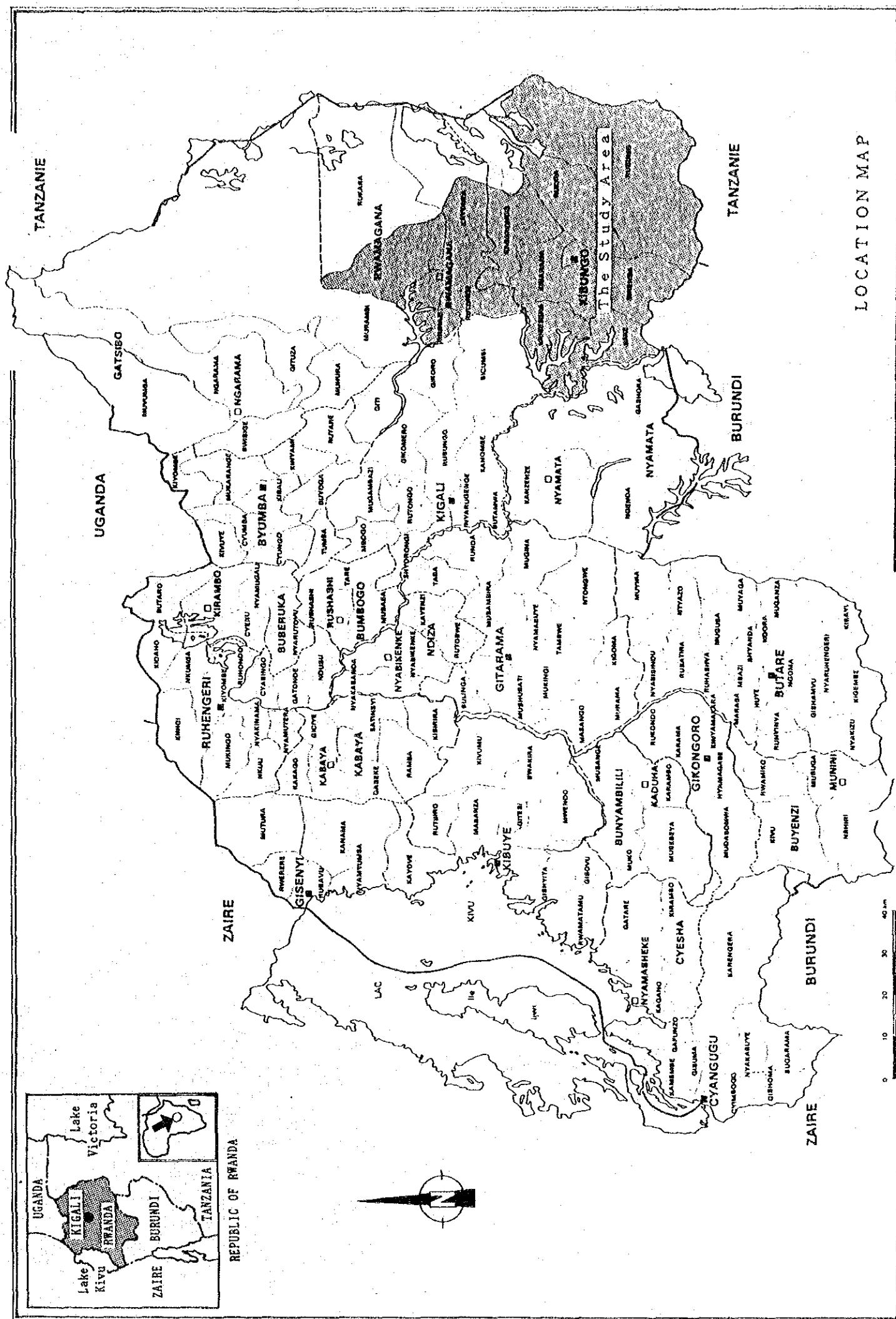
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JANUARY 1992

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

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REPORT STRUCTURE

The Report consist of following five(5) documents:

VOL.	I	:	SUMMARY REPORT
VOL.	II	:	MAIN REPORT
VOL.	III	:	SUPPORTING REPORT
VOL.	IV	:	DRAWINGS
VOL.	V	:	DATA BOOK

Note:

The reliance is placed upon the Appendices to present overall complete details of the Study aspect. This report design mean that some duplication occurs between Supporting Report and Main Report, however this is considered acceptable to ensure report completeness.

SUPPORTING REPORT

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DEFINITION

1. the Study : the Study on Rural Water Supply Project
2. the Study Area : the area of the Kibungo Prefecture selected for Rural Water Supply Project of Phase III Study
3. the Basic Plan : the Basic Rural Water Supply Plan of Phase III Study
4. the Basic Plan Area : the area of the Study Area selected for the Basic Plan
5. the Area : the Basic Plan Area to be used in the case of avoidance of repetition
6. the Individual Project: the individual Project of the Basic Plan which is covered by one water supply system
7. the Possible Project : Scheme : the Scheme for implementation of high priority individual projects selected from the Basic Plan
8. the Possible Project : /Possible Individual Project : the individual Project of the Basic Plan selected for high priority Rural Water Supply Project
9. the Service Block : the area which will receive the benefits from the individual Project
10. the Block : the Service Block

ABBREVIATIONS

AIDR	: Association of International Rural Development (Belgium)
APHA	: American Public Health Association
B/D	: Basic Design
CIF	: Cost, Insurance and Freight
COFORWA	: Corporation for Rwanda Water
DAC	: Development Assisting Countries
D/D	: Detailed Design
DGW	: Directorate General of Water (MINITRAPEE)
EIU	: Economic Intelligence Unit
ELECTROGAZ	: A Public Organization to Produce Electric, Gaz and Water Supplies
FAO	: Food and Agricultural Organization of UN
FOB	: Free on Board
F/S	: Feasibility Study
IBRD	: International Bank for Reconstruction and Development
IDA	: International Development Association
JICA	: Japan International Cooperation Agency
GDP	: Gross Domestic Product
GNP	: Gross National Product
GO	: Government Organization
GOJ	: Government of Japan
GOR	: Government of the Rwanda
GRDP	: Gross Regional Domestic Product
MINAGRI	: Ministry of Agriculture, Livestock and Forests
MINIMART	: Ministry of Industry, Mines, Artisanry and Crafts
MININTER	: Ministry of the Interior and Communal Development
MINIPLAN	: Ministry of Planning
MINISANTE	: Ministry of Public Health
MINISAPASO	: Ministry of Public Health and Social Affairs
MINITRAPEE	: Ministry of Public Works, Energy and Water
MIS	: Management Information System
O/M	: Operation and Maintenance
PD	: Planning Department, DGW
RWIO/ER	: Project Implementation office of Rural Water Supply Project in Eastern Region
RWSD	: Rural Water Supply Department, DGW
RWSP/ER	: Rural Water Supply Project in Eastern Region
SVN	: Dutch Volunteer Organization
TA	: Technical Assistance
UN	: United Nations
UNDP	: United Nations Development Program
UNICEF	: United Nations Children's Fund
WHO	: World Health Organization

CONVERSION FACTORS

<u>Unit</u>	<u>Comparison</u>	<u>English Equivalent</u>
Unit of Length :		
Millimeters (mm)	0.001 m	0.0394 inch
Centimeter (cm)	0.01 m	0.3937 inch
Meter (m)	3.2800 feet	
Kilometer (km)	1,000 m	0.6213 mile
Unit of Area :		
Square centimeter (cm ²)	0.0001 m ²	0.155 square inch
Square meter (m ²)		10.764 square feet
Hectare (ha)	10,000 m ²	2.471 acres
Square kilometer (km ²)	1,000,000 m ²	0.3861 square mile
Unit of Volume :		
Cubic centimeter (cm ³)		0.061 cubic inch
Liter (lit)	1,000 cm ³	0.264 US gallons (0.21997 gallons)
Cubic meter (m ³)	1,000 lit	35.3145 cubic feet
Unit of Weight :		
Gram (g)		0.0353 ounce
Kilogram (kg)	1,000 g	2.2046 pounds
Metric ton (ton or mt)	1,000 kg	2,204.6 pounds

UNIT OF MEASUREMENT

mm	:	millimeter(s)
cm	:	centimeter(s)
m	:	meter(s)
km	:	kilometer(s)
cm ²	:	square centimeter(s)
m ²	:	square meter(s)
km ²	:	square kilometer(s)
lit	:	liter(s)
m ³	:	cubic meter(s)
lit/sec	:	liter per second
m/sec	:	meter(s) per second
PPM or ppm	:	part(s) per million
g	:	gram(s)
kg	:	kilogram(s)
ton	:	ton(s)
m ³ /sec second	:	1,000 lit/sec = 35.3145 cubic feet per = 15,850 US gallons per minute
m ³ /sec/day	:	8.64 mm depth over 10 km ²
sec	:	second(s)
min	:	minute(s)
hr	:	hour(s)
Max.	:	maximum
Min.	:	minimum
p.a.	:	per year
%	:	percent(s)
No. or no.	:	number
°C	:	degree centigrade
°F	:	degree fahrenheit
KW	:	kilowatt(s)
KWh	:	kilowatt(s) hour = 1,000 WH
-GL	:	below ground level
GW	:	groundwater
GWT	:	groundwater table
EL	:	elevation above MSL
MSL	:	mean sea level
HWL	:	high water level
LWL	:	low water level

EC	:	electric conductivity
Et	:	evapotranspiration
pH	:	potential of hydrogen
CO2	:	carbonic acid
NH4	:	ammonia
N	:	nitrogen
SS	:	suspended solids
Cl	:	chlorine
NO2	:	nitrogen dioxide
NO3	:	nitrogen trioxide
SO4	:	sulfur oxide
PO4	:	phosphorus oxide
Ca	:	calcium
Mg	:	magnesium
Mn	:	manganese
Fe	:	iron
O/M	:	operation and maintenance
EIRR	:	economic internal rate of return
FIRR	:	financial internal rate of return
B/C	:	benefit cost ratio
NTV	:	net present value
FY	:	fiscal year (1st of January to 31st December)
FRW	:	Rwanda Fran(s) = US\$0.0078 (as of Aug. 1991)
US\$:	dollar(s) = 128 FRW (as of Aug. 1991) = 135 JY
JY	:	Japanese Yen

APPENDIX A
BACKGROUND

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BACKGROUND

1. PHYSICAL CONDITIONS

1.1 LOCATION

The Republic of Rwanda, situated in central Africa, extended between latitudes of 1° and 3° South and longitude of 29° and 31° East. Its territory covers 26,338 km². The neighboring countries are the Republic of Uganda in the north, the Republic of Burundi in the south, the United Republic of Tanzania in the east, and the Republic of Zaire in the west. Natural boundaries are formed by Lake Kivu in the west, a volcanic chain of mountains in the north and the Akagera River to the east and south.

Rwanda covers an area of 26,338 km² and has a population of 6.75 million (1987) with 3.3% of annual growth rate. The population density is 256 persons/km², highest in Africa.

The capital Kigali is located 1,200 km as the crow flies from the Indian Ocean, and 2,000 km from the Atlantic Ocean. In the western part of the country some of the peaks in the range composing the Zaire-Nile ridge reach a height of 3,000 meters, while in the northern part, the Zaire-Nile ridge ends in a chain of extinct volcanoes, the highest of which is Karishimbi, 4,507 meters in height. The eastern part of the country is less mountainous and the average altitude is 1,300 meters (see Fig. A.1).

1.2 TOPOGRAPHY AND GEOLOGY

Northern and western areas of the Country are characterized by volcano ranges and huge mountains covered with lush jungles/natural forests and contain the sources of the main rivers and streams which cross the Country. There are many volcanic lakes and the biggest of which is Lake Kivu containing limpid water.

The center and southern areas consist of hilly to rolling land with small plains containing bush/cultivated land. South-eastern and eastern areas is mainly composed of plateaus and bushy plains with numerous marshes/lakes.

The land within Kibungo Prefecture which is located in eastern portion of the Country, is dissected/undulated and the average elevation is about 1,500 m above sea level. Its geology is made up of eroded, upheaved, and folded Pre-cambrian strata (see Fig. A.2).

1.3 CLIMATE

Even though the country is near to the equator, where the annual average temperature is 22°C and the mean annual rainfall in Kigali, the capital, is about 1,000 mm. The year is divided into four seasons which do not influence the temperature to a great extent.

- | | | |
|-----------------------|---------------|-----------------|
| - Long rainy season : | Mid-March | - Mid-May |
| - Long dry season : | Mid-May | - Mid-September |
| - Short rainy season: | Mid-September | - Mid-December |
| - Short dry season : | Mid-December | - Mid-March |

The annual rain-fall pattern within the Country is presented in Fig. A.3.

2. INSTITUTIONAL BACKGROUND

2.1 TRIBAL SYSTEM AND OUTLINE OF THE HISTORY

For many years, the Hutu tribe (about 90% of the population) dominated the Tutsi tribe (about 10% of the population). The Hutus, after becoming acquainted with the principles of democracy, brought on the civil war. Then, on July 1, 1962, Rwanda gained its independence from Belgium.

Rwanda is a nonaligned nation and has maintained friendly relation with both eastern and western powers. However, for its economic development, the country prefers to receive technical assistance and grant aid from western powers such as Belgium, France, and Germany.

In October of 1990, an armed group of refugees who had previously fled to Uganda forcibly re-entered Rwanda inciting a rebellion. The Government of Rwanda suppressed the revolt and the aftermath resulted in serious problems for the Government, such as the re-entry of refugees.

2.2 GOVERNMENT ORGANIZATION

The Central Government of Rwanda is composed of the Office of the President and seventeen ministries (see Table A.1).

The country is divided into ten provinces as shown in Fig. A.3. Each province is headed by a governor (Bourgmestre) appointed by the president. Each province is divided into Communes. Each Commune has a population ranging from 30,000 to 40,000 people. The Communes are further subdivided into Secteurs, each having about 3,000 people. Within a Secteur there are from 50 to 100 household cooperative neighborhood communities called "Cellules". A "Commune" is the smallest self-governing unit having its own budgetary fund.

3. GENERAL ECONOMY AND SOCIAL CONDITIONS

3.1 GENERAL ECONOMY

(1) Outline of Economic Structure

Rwanda is a typical agricultural country. More than 90% of the people are engaged in farming. Mainly, they cultivate bananas, beans, and potatoes for self consumption. Coffee and tea are cultivated for export purposes and account for more than 50% of the country's total export amount. The agricultural productions and cultivated areas are listed in Table A.2.

But, due to the fall of prices for these products on the international market and the lower value of the U.S. dollar in recent years, the country's income from exports has fallen accordingly. Oil is the country's major import item.

The Gross Domestic Product (GDP) had grown at an average rate of around 4% yearly between 1982 and 1986, but from 1983 to 1984, its growth was decelerated to as low as 1.8% per annum. Nevertheless, during the subsequent period between 1984 and 1986, the Rwandan economy recovered from the said sluggish performance obtaining an annual growth rate of 8%.

An estimate of MINIPLAN indicates that major sectors which contributed greatly to GDP formation in 1987 were:

- Agriculture, forestry and fishery (37%),
- Manufacturing (23%),
- Personal and public services (40%).

The 1987 GDP per capita was about US\$ 310.

In October of 1990, an armed group of Tutsi refugees who had previously fled to Uganda forcibly entered Rwanda causing a rebellion. The resultant aftermath of the rebellion brought about sudden change of economical conditions in Rwanda.

(2) Foreign Trade

External trade with Rwanda is represented by agricultural and mining products for export and capital and consumer goods for imports. The total export (FOB base) in 1986 was SDR 159 million against the total import (FOB) of SDR 236 million, yielding an SDR 78.06 million trade deficit. From 1982 to 1983, a trade deficit was registered due to depressed price of coffee in the international market. Generally, a deficit in foreign trade of SDR 60 to 90 million was recorded between 1983 and 1986. The unfavorable balance of trade also continued from 1986 to 1990. (see Table A.3).

(3) Balance of international Payment

The balance of international payments (including long-term capital revenue) for 1986 accounted for a surplus of FRW 27,540 million and increased approximately FRW 31,280 million from the previous year.

The net international reserve as of 1987 was US\$ 164.19 million. The external debt had been increasing.

The 1986 foreign debt balance was US\$ 439 million, while the foreign currency reserve was US\$ 162 million, both on the increase. The 1986 debt service rate (DSR) was 7.6%, the foreign exchange rate of 1987 was FRW 73.02/US\$.

The exchange rate of the FRW dropped from 80 FRW/US\$ to 120 FRW/US\$ in November, 1990 on account of the resultant aftermath of the rebellion. The exchange rate in August, 1991 is 128 FRW/US\$.

(4) Money Supply and Price Trend

The money supply has been increased at the rate of 13.7% per year between 1984 and 1986. The total money supply in 1986 was FRW 26.48 billion.

The annual consumer price rate had been comparatively stable, at less than 7% between 1983 and 1987.

The consumer price indicators in 1987 against 1982(=100) is 115.2 and the annual rate of increase is estimated as an average of 3.9%. The indicators between 1984 and 1988 are shown in Table A.4.

The resultant aftermath of the rebellion brought about a sudden increase of consumer prices. The prices of import goods were raised at rate of 1.9 times from Oct. 1990 to Jul. 1991 and that of domestic products had been increased at rate of 1.2 to 1.5 times.

The consumer prices at Kigali in May, 1990 and July, 1991 are given in Table A.5, which were obtained through the Study of Stage III in Rwanda.

(5) Government Revenues and Expenditure

The annual revenue of Rwanda in 1987 was FRW 29,520 million (ordinary revenue). The annual expenditure in 1987 was FRW 37,320 million (ordinary expenditure: FRW 25,570 million and capital expenditure: FRW 11,750 million), resulting in a deficit of FRW 7,750 million-increased approximately FRW 1,070 million from the previous year. The debt was supplied from both internal (40%) and external (60%) sources.

Annual expenditure of each ministry between 1983 and 1987 is given in Table A.6. Total expenditure of ministries of the Government in 1987 was 20,702 million FRW.

The country's major economic indicators are listed in Table A.7.

3.2 POPULATION

(1) General

Referring to the information of MINIPLAN (1988), Rwanda had a population of 6,750 thousand and population density of 256 persons/km² which had growing at an annual rate of 3.3% since 1978, one of the highest population growths in Africa. The distribution of population by age groups as of 1990 were 51.0% (0-14 years old), 45.0% (15-65 years old), and 4.0% (older than 65 years old) as shown in Table below.

CHANGE OF POPULATION COMPOSTION OF EACH AGE-GROUP

Age	1970	1978	1986	1990
Less than 15	50.7	45.7	49.0	51.0
15 ~ 65	47.6	51.6	47.5	45.0
More than 65	1.7	2.8	3.5	4.0
Total	3,850,000	4,820,000	6,252,000	7,034,000

Source : Rwanda Embassy in Japan

An economic active population (in Rwanda people older than 15 years are taken into account) was estimated to be 3,190 thousand in 1986.

The Government of Rwanda established the Office for National Population (ONAPO) to promote family planning by teaching contraceptive methods. Strong opposition by the Roman Catholic Church has prevented this program from progressing to any great extent.

Rwanda's population distribution is shown in the following Table. From this Table, the high population density in the western regions can be recognized.

<u>Prefecture</u>	<u>Population</u>	<u>Area</u>	<u>Density</u>
Butare	746,632	1868.41	399
Byumba	590,234	2759.88	213
Cyangugu	407,191	1144.79	355
Gikongoro	459,935	1596.37	288
Gisenyi	583,993	1325.39	440
Gitarama	731,280	2213.97	330
Kibungo	416,249	2891.94	143
Kibuye	372,732	1285.36	289
Kigali	752,859	3033.63	248
Ruhengeri	667,043	1471.75	453
Total	5,728,248	19591.49	292

Source: Production Agricole En 1987 (Minagri)

Indexes related population which is given in Table A.8, show higher population density and higher growth rate within Africa.

(2) Labor force

The agricultural sector provides the greatest opportunity of employment within the country's labor market; it accounted for 91% of the total employment in 1986. The employment recorded 93% of agricultural sector, 3% of manufacturing sector and 4% of service sector within the nation's total employment in 1980 - the latest year available this kind information.

3.3 OUTLINE OF RWANDAN INDUSTRIES

The trend of Rwandan primary, secondary and tertiary industries is outlined below.

Primary Industries:

According to last year's industrial conditions, the primary industries that form the basis of Rwanda's Gross Domestic Product (GDP) consisted of farm food products. The market value of the food products represented 37.5% of the GDP while the secondary and tertiary sectors accounted for 22.7% and 36.7% respectively.

Food production in 1987 amounted to 4,676,152 tons. This was 0.6% more than the previous year.

Secondary Industries:

Rwanda's secondary industries are mainly related to energy, food processing, and handicraft.

A review of the industrial trend covering the 1983 to 1986 period made it possible to determine that the added values of the secondary industries during 1987 were 5.7% less than those of 1986. The added values of 1986 amounted to 40.096 billion FRW while those of 1987 were 37.794 billion FRW.

Tertiary Industries:

In general, the increase rate of the tertiary industries of Rwanda prior to 1986 was very small and amounted to only 1.47% per year. However, in 1986, the jumped to 9.1%. The increase rate of the transportation industry in particular was significant. Commodity movement increased due to the improvement of the country's road network.

3.4 INFRASTRUCTURE

(1) Transportation System

Since Rwanda is landlocked and largely rugged and mountainous with a series of plateaus in its eastern area, the securing of a transportation means is a most important subject affecting the country's economic activities. The road network, supplemented by waterways and air transport, is undergoing improvements.

Under the Third National Development Plan (1982-1985), 14.7 million FRW was invested for improvement of the road network. As a result, in 1988, paved-road length became

952 km and the total road length, including second-class and rural roads, became 12,480 km.

Major Roads in Rwanda		
SECTION		LENGTH(km)
Kigali-Rusumo	(To Tanzania)	180
Kigali-Butare -	(to Burundi)	167
Kigali-Ruhengeri	(to Zaire)	157
Kigali-	(to Uganda)	25
Butare-Changugu	(to Zaire)	157
-		56
Kigali-	(to Uganda)	90
Kayonza-	(Under construction)	120
Gitarama-Kibuye	(Completed Feasibility Study)	
Gitarama-	(Completed Feasibility Study)	

Source : Ministry of Transportation of Rwanda

Lake Kivu is the main waterborne transportation route. The National Rwanda Airline handles approximately 70% of the airborne transportation. Two international airlines make flights to Rwanda: Air France (Paris - Kigali) and Sabena Airline (Brussels - Kigali).

(2) Energy

Other than electricity, Rwanda's energy sources include natural gas, wood, charcoal, and agricultural by-products. ELECTROGAZ supplies electricity for agricultural and domestic use.

The demand for domestic-use electricity increased by 70% during the 5-year period from 1981 to 1985. During the same period, the country's power supply increased 45%, from 64 million kwhr to 93 million kwhr, due to the high-voltage power line expansion to 1,700 km (see Table A.9). The self-sufficiency rate of the power supply also improved from 37% in 1981 to 112% in 1984 in accordance with the Rwandan Government's energy-supply self-sufficiency policy.

The country's energy supply and demand conditions were as shown in the following Table:

TREND OF ENERGY PRODUCTION AND CONSUMPTION

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Electricity (million kwhr)					
Produced	23	65	86	94	88
Imported	55	26	12	11	21
Consumed	64	73	75	94	93
Self-sufficiency Rate (%)	37	89	114	100	95
Natural Gas (million m ³)					
Produced	--	--	522	678	1028
Consumed	--	--	435	565	1027

Source : IMF Report

Note : Natural gas (methane) was produced from Lake Kivu whose reserves are estimated as being 63 billion m3).

3.5 OTHERS

Rwanda's social conditions are summarized as follows:

1) Ethnic Groups

There are three ethnic groups in Rwanda:

. Hutu (Bahutu)	89.8%
. Hamitoh & Nirotic	8.9%
. Twa (Pygmy)	0.4%

2) Capital: Kigali (pop. 140,000)

Other major cities: Butare (pop. about 30,000) and Gisenyi (pop. about 20,000)

3) Form of Government:

Republic. Became independent in 1962 from Belgium trust territory. Resident: Juvenal Habyarimana

4) Currency:

Rwanda Franc (FRW), 128 FRW = US\$1 (Aug. 1991)

5) Language:

Kinyarwanda and French (both are official languages)

6) Time: Greenwich Meridian Time plus 2 hours

7) Religions (as of 1978):

. Roman Catholic	51.7%
. Imana	23.9%
. Protestant	15.2%
. Other Christian sects	6.3%
. Others	0.8%

8) Education:

- . Primary education (attendance rate):
67.9% (761,965 persons)
- . Total farmer education:
23.7% (23,473 persons)
- . Secondary education (number of students):
14,651 persons; 66.1% male and 33.9% female
- . Higher education (number of students):
2,264 persons; 1,631 students in domestic schools
and 633 students in overseas schools

4. PUBLIC HEALTH AND HYGIENE

4.1 INDEX OF HEALTH AND HYGIENE CONDITIONS

The index of Rwanda's public health and hygiene conditions are lower than the average of other African nations and indicates that Rwanda's public health and hygiene conditions are not sufficient.

Item	Rwanda	African Average	World Average	Japan
Life expectancy at birth(1985-90)	48.5	51.3	61.1	77.2
Infant mortality (1985-90)(1/1000)	122	101	71	6
Child mortality (1985-90)(1/1000)	205	163	105	8

The hygiene conditions are typical of those in Central Africa, however the improvement of public health conditions in Rwanda had decreased the rate of mortality and increased life expectancy.

To improve public health and hygiene conditions, MINISANTE has been exerting effort to achieve the following objectives, but, thus far, practical results have been minimal:

- . Improvement of hospitals and health care centers
- . Cultivate staff for medical care and public health
- . Improvement of medical supplies and inventories
- . Promotion of social education related to public health and hygiene.

The public health facilities in each prefecture are given in Table A.10.

4.2 PROMINENT DISEASES

The ten most prominent diseases in Rwanda are listed in the following Table. The rate of waterborne disease is high. From the figures in the Table, the importance of safe drinking water must be emphasized.

Name of Disease	Incidence Rate (per 100,000)
1. Malaria	16,629
2. Diarrhea	2,312
3. Pneumonia	1,936
4. Gastritis	1,485
5. Venereal Disease	680
6. Chicken Pox	199
7. Malnutrition	199
8. Traffic Accident	175
9. Parotitis	118
10. Fever	116

Source: MINISANTE's 1989 Annual Report

4.3 SEWAGE

According to the surveys conducted by the Public Health Bureau and WHO in 1984, the rate of use of the pit-toilet was 84% in rural and small city areas. This figure was very high in comparison with those of neighboring countries. The pit-toilet use rate in Rwandan rural areas was higher than in the urban areas. However, according to MINISAPASO's plan, the pit-toilet rate did not reflect the actual sanitary conditions. In spite of the high rate, reproduction related diseases and diseases contracted orally were high.

5. NATIONAL DEVELOPMENT PLAN

Since the country gained its independence in 1962, the Government of Rwanda launched the following National Development Plans:

- 1) The First Five-year Economic, Social, and Cultural Development Plan (1966-1970)

- 2) The Second Five-year Economic, Social, and Cultural Development Plan (1977-1981)
- 3) The Third Five-year Economic, Social, and Cultural Development Plan (1982-1986)
- 4) The Fourth Five-year Economic, Social, and Cultural Development Plan (1987-1991)

The Third Five-year Economic, Social, and Cultural Development Plan drew up the following four slogans:

- . Stable supply of food
- . Creation of employment opportunities and cultivation of skillful engineers
- . Improvement of people's living environment (public health and hygiene, and cultural fields)
- . Maintenance of friendship with neighboring countries

The evaluation report for the Third Five-year Economic, Social, and Cultural Development Plan was published in December 1988 by MINIPLAN. The report consists of the following:

- . Situation of each sector immediately after the Third Five-year Economic, Social, and Cultural Development Plan was placed in effect
- . Evaluation of investment plan in each sector during the period of Plan enforcement
- . Relationship between the investment and development of each sector during the period of Plan enforcement

Strategies to achieve the above objectives are as follows:

- (1) To educate manpower by improving primary and secondary education and vocational training, and to increase employment opportunities in agricultural and non-agricultural sectors.
- (2) To increase farm production (including dairy production) and lumber production through the effective use of resources.
- (3) To develop industries by combining factory production industries with handiwork.
- (4) To support cooperative, manufacturing, sales, and consumer unions.
- (5) To unify transportation and communications systems to increase the food supply rate.
- (6) To harmonize population control and public health policies.

- (7) To effectively use living spaces corresponding to the expanding urbanization.
- (8) To develop domestic energy and to secure water supply stations.
- (9) To establish the monetary and marketing policies needed to bring about self-sufficiency in the supply of food.
- (10) To establish policies for increasing economic efficiency by systematization and, at the same time, to alleviate the economic difference between urban and rural areas.

- (11) To achieve the development objectives smoothly through international cooperation (introduction of foreign currencies and technology transfers).

The main features of the Fourth Five-year Economic, Social, and Cultural Development Plan (1987-1991) were announced in November 1986. The details of the Plan are being prepared by MINIPLAN based on the development strategies of each ministry. It is expected that the domestic water strategies of each ministry. It is expected that the domestic water supply project will be given high priority in this Plan as it was in the Third Five-year Economic, Social, and Cultural Development Plan.

6. WATER SUPPLY

6.1 EXISTING CONDITIONS OF WATER RESOURCES

According to a survey conducted in 1984, the per capita water supply amount in rural areas was approximately 10 liters.

As in the country's western and northern region where the much rain falls, they have an annual rainfall of more than 1,000 mm. Sufficient yield of spring water can be provided because of the much rainfall and the large catchment areas for spring in the regions.

The following problems of surface water do exist, though the country has many lakes and plentiful water sources:

- . Surface water is contaminated by domestic drainage
- . Residential areas are mostly located on high plateaus
- . Residents have low maintenance and management capabilities in matters concerning water supply facilities. This is due to the low technical level and insufficient funds.

For the above reasons, springs having high quality water that may be distributed by gravity flow and high quality groundwater have high development potentials as the sources of rural water supply facilities. Actually, most existing water supply facilities utilize developed springs.

However, in the country's eastern region where the least rain falls, they have an annual rainfall of less than 1,000 mm. In addition, small catchment areas for spring are mainly found on account of the complicated rolling terrain. According to the natural conditions, residents use not only spring water but also surface water as a drinking water in the region.

6.2 EXISTING CONDITION OF WATER SUPPLY

The safe drinking water supply rate throughout the entire country was 37% in 1981. In 1986, when the Third National Development Plan was completed, the rate improved to 64%. 48% of the people were able to obtain water from improved springs. 16% of the people were able to receive water via piped supply systems.

Rwanda's domestic water supply rate of 64% is high in comparison to the rate in neighboring countries. However, the following problems exist:

- 1) The domestic water supply rate varies a great deal from one prefecture to another and from one region to another and from one region to another. For example, the rate in Kibungo prefecture is only 21% while those in Gitarama and Butare prefectures are 83%. Even in these two prefectures, the rates vary considerably from one city or village to another.
- 2) Frequent and long time water-supply suspension occurs.
- 3) The installation of public standpipes vary from one prefecture to another. Including urban areas, the average installation rate of public standpipes is 28 per 100 households.

Improvement of urban water supply was stressed in the Third National Development Plan. A great deal of money was spent modernizing water supply systems in urban areas which had been relying on simple water supply facilities.

Twelve cities (Rwamagana, Nyabisidu, and provincial government located cities, including Kigali) now have modern water supply systems with water purification plants. The facilities are operated and managed by

ELECTROGAZ.

The adopted water fee system (see the following Table) and the maintenance and operation of the facilities and well managed.

Conditions of Urban Water Supply Facilities

Item	Unit	1983	1984	1985	1986	1987
Number of Household Users	Number	5,149	6,888	7,620	8,615	10,613
Supply Amount	Million m3	5.14	5.97	5.79	6.87	8.21
Consump.	Million m3	4.24	5.04	5.31	5.79	6.29
Supply Consumption	%	78.4	84.4	91.7	84.3	76.6
Fee Rate:						
0-25 m3	FRW/m3	40	40	40	40	40
25-60 m3	FRW/m3	60	60	60	60	60
60 m3<	FRW/m3	80	80	80	80	80

Source: 1987 Rwandan Economy and Currency, Rwanda National Bank

In 1985, there were 292 simple water supply systems for rural areas. 243 of these systems were gravity flow types. Six of them had water purification facilities. There was a total of 3,939 km of piping and 2,459 supply connections for the systems. 44,000 m3 of water was supplied daily by the systems. And, by assuming that one household consumed an average of 80 liters a day, approximately 55,000 households benefitted from the facilities.

After the withdrawal of AIDR (Association of International Development for Regions, Belgium) that had contributed to the maintenance and operation of rural water supplies, the following organizations have been in charge of the maintenance and operations, but, due to the lack of staff and budgetary funds, the deterioration of the facilities has been progressing.

Name of Organization	Percentage(%)
Communes	8.9
Users' Groups	44.5
Private Organizations	18.2
Water Associations	28.4

Source: Evaluation Report of the Third National Development Plan, MINIPLAN, 1988

As for water quality management, the Water Resources Department in ELECTROGAZ (a public corporation that was established in 1986 and is in charge of the production and supply of electricity, water, and gas under the supervision of MINITRAPEE) prepares bacteria analyses and the analyses of water pollution caused by chemical fertilizers and compost.

Water treatment facilities in rural areas are a rarity and operate at a financial loss. It will be necessary to improve the management and operation system of these facilities.

6.3 DEVELOPMENT STRATEGIES FOR THE WATER SUPPLY SECTOR

(1) General

The Government of Rwanda regards the water supply project that is intended to provide all Rwandans with safe drinking water as being of utmost urgency. The implementation of the project, starting in the poorest of the eastern areas, commenced in 1981.

As its policy, the Government emphasizes the development of small scale water sources and water distribution by gravity flow, and, if necessary, the installation of supplementary pumping systems and water treatment facilities. Some of the facilities have already been installed.

In the Fourth National Development Plan (1987-1991), the objectives of the Water Supply Plan were to establish rules and laws that would be the basis of rational water management and would make the supply of water to people living in eastern areas which have the poorest water supply conditions in the country a realization.

By referencing the Third National Development Plan's water supply project and by considering the Government's present financial difficulties, 85% of the Fourth National Development Plan's project costs should be financed by foreign aid in order to achieve the above-mentioned objectives. The remaining 15% is to be financed by the Government of Rwanda. However, in view of the large trade balance deficit, poor foreign currency reserve, and the acute financial conditions due to public debts, it would be extremely difficult to achieve the development objectives.

(2) Strategies and Actual Spent of Third National Development Program

In Rwanda, water supply system improvements are

conducted by MINITRAPEE. Providing a supply of fresh water to the people of Rwanda is the country's highest priority objective. During the period of the Third Five-year Economic, Social, and Cultural Development Plan, more money was invested in the water supply sector than originally planned (see Table A.10).

Major projects and activities under the Third Five-year Development Plan were as follows:

- | | | |
|----|--------------------------------------|----|
| 1) | Development projects in urban areas: | 9 |
| 2) | Development projects in rural areas: | 16 |
| 3) | Nationwide projects: | 5 |

The progress of the development projects in rural areas were as follows:

Completed projects	8
Still continuing by close to completion	1
Study project with promised funds	1
Projects awaiting financing	3
Project under study stage	1
Projects under planning stage	2

Planned and Actually Spent Money in the Water Supply Sector During the Third Five-year Economic, Social, and Cultural Development Plan Period

(unit: million FRW)							
Category	Planned Amount	1982	1983	1984	1985	1986	Total
Urban Water Supply	1,930	147.2	176.0	292.0	684.8	690.2	1,990.3
Rural Water supply	1,200	341.5	256.3	554.0	339.2	664.6	2,155.6
	3,130	488.7	432.3	846.0	1,024.0	1,354.9	4,145.9

Source: Evaluation Report for the Third Five-year Economic, Social, and Cultural Development Plan (1982-1986), by MINIPLAN, 1988

(3) Strategies of the Fourth National Development Program

In 1988, MINITRAPEE announced the development strategies for sectors that will be the basic data of the Fourth Five-year Economic, Social, and Cultural Development Plan. The strategies encompass four sectors: water supply; roads; energy; and urban planning.

No definite slogans have been drawn up for the water supply sector.

For the following projects planned to be implemented under the Fourth Five-year Development Plan (1987-1991), the cultivation of engineers and the promotion of education for residents in the water supply sector are stressed.

PROJECT NAME	AMOUNT OF MONEY (million FRW)
1) MINITRAPEE's Water Bureau's Organization strengthening plan	250
2) Plan to uplift people's awareness of the rural water supply	80
3) Public health education plan	25
4) Technical center plan related to hand pumps and flush toilets	114
5) Plan to cultivate rural water supply facility operation and management personnel	104
6) Plan to uplift people's awareness of sewerage problems	21
7) Eastern region domestic water supply development project, Phase III	80
8) UNICEF domestic water supply project	317
9) Rural water supply facility rehabilitation project	492

6.4 BUDGETARY FUND AND ORGANIZATION OF THE WATER SUPPLY SECTOR

(1) Budgetary Conditions of MINITRAPEE

MINITRAPEE's General Direction of Water (established in 1984) is in charge of Rwanda's water supply sector. They perform the following work:

- . To strengthen to organizations and cultivate the engineers related to domestic water supply development

- . Plan, investigate and prepare technical studies for water supply projects
- . Investigate water sources
- . Promote resident education

The Government's 1984 budgetary fund amounted to 18.65 billion FRW (192 million US dollars). MINITRAPEE's portion was 6.8% (1.25 billion FRW which is equivalent to 13 million US dollars). The General Direction of Water's budgetary fund was only 70 million FRW (720,000 US dollars) and represented only 5.6% of MINITRAPEE's budgetary fund, while overall development budget for rural water supply of 3,130 million FRW includes foreign aids. Of the 70 million FRW, 30 million FRW (310,000 US dollars) was allotted to rural water supply projects. However, it is believed that this amount would be insufficient to solve the domestic water supply problems faced in the rural areas.

To improve the domestic water supply facilities in rural areas, it would be necessary to rely on aid from foreign governments and international organizations.

Table below shows MINITRAPEE's and the General Direction of Water's organizations. The annual budgetary funds for these two organizations are listed below:

Fiscal Year	Government's Budgetary Fund	MINITRAPEE	(unit: 1,000FRW)
			General Direction of Water
1986	25,340,383	1,543,211	158,529
1987	26,921,877	1,404,895	84,527
1988	39,908,839	1,463,626	103,880
1989	36,454,670	-	-

(2) Institution of Water Supply Services

i) MINITRAPEE

The Water Supply Sector is handled by the Ministry of Public Works, Energy and Water (MINITRAPEE) in the Republic of Rwanda. The water supply sector contributes the improvement of the living environment for the nation which one of the objectives in the Third National Development Plan.

MINITRAPEE consists of the following five (5) Sections.

General Secretary

Directorate General of Civil
Structure, Urban Planning and
Habitation

MINITRAPEE

Directorate General of Road and
Bridges

Directorate General of Energy

Directorate General of Water (DGW)

The Directorate General of Water, one of the Directorates of MINITRAPEE responsible for overall planning, coordination and supervision of water resources development and water supply projects. The organization of the Directorate General of Water consists of 4 Departments as follows:

- Secretary
- Planning Department (PD)
- Urban Water Supply and Sewage Department
- Rural Water Supply Department (RWSD)

ii) Related Ministries and Agencies

Agencies related to water supply projects are as follows:

ELECTROGAZ:	Responsible for the operation and management of urban water supply facilities under the jurisdiction of MINITRAPEE.
MINIPLAN:	Responsible for planning and providing financial assistance for rural water supply projects
MINIAGRI:	Responsible for the management of water source areas and hydrological data
MININART:	Responsible for the management of hydrogeological data
MINISANTE:	Responsible for the management and providing public health and hygiene services
MININTER:	Responsible for providing financial assistance for small-scale water supply projects to Communes

iii) Water Management Organization

Presently, the management of water supply facilities is carried out by groups organized by commune administrators and facility users, private citizen groups, and committees concerned with water.

- [Governmental Organizations]:

The overall management of water sources, matters relating to meteorology, hydrogeology, and water use for agriculture (irrigation water) are not in the realm of DGW's responsibilities.

ELECTROGAZ was established as a public organization to produce electricity, gas and water supplies. Its activities are generally limited to urban areas, however some activities related to complicated plants in rural areas are planned to be expanded. ELECTROGAZ comes under MINITRAPEE's jurisdiction.

- [Nongovernmental Organizations]:

The largest nongovernmental organizations for water management are COFORWA and SVN. These organizations with AIDR developed 93% of the water sources for the water conveyance systems in the country's rural areas by 1984 (more than 95% of the total length of the systems).

AIDR (Association of International Rural Development, a private association of Belgium)

Before 1964 there were no governmental organizations in charge of drinking water in rural areas. Prior to that time (starting in 1965) the construction, management, operation and maintenance of drinking water supply facilities in rural areas were entrusted to AIDR.

In 1985, some Rwandan national nongovernmental organizations were established and AIDR's activities in Rwanda were halted.

COFORWA (Corporation for Rwanda Water)

The strongest nongovernmental organization is COFORWA which extend its activities throughout the country.

This corporation was established as a nonprofit organization in 1981. Its wide activities are supported by financial backers including the

Government of Rwanda and various foreign nongovernmental organizations.

For the past several years, COFORWA has been forming facility user organizations to carry out the effective use of water supply facilities and to manage, operate and maintain facilities once they have been constructed.

SVN (Dutch volunteer organization)

SVN was established for the following two purposes:

- i) To dispatch specialists to governments or organizations in Third World countries.
- ii) To make the Dutch aware of the problems associated with the development projects being funded by Holland.

SVN commenced its activities in Rwanda in December 1978. Since 1979 they have been engaged in rural water supply projects in Rwanda.

In 1980, under a tentative agreement with the Government of Rwanda, SVN's activities in Rwanda were placed under the jurisdiction of the Government. The agreement was formally approved in 1982.

iv) International Organization

International organizations which contribute to the Rwandan water resources and domestic water supply development are described in Section 7.2 of Appendix A.

7. DEVELOPMENT ASSISTANCE

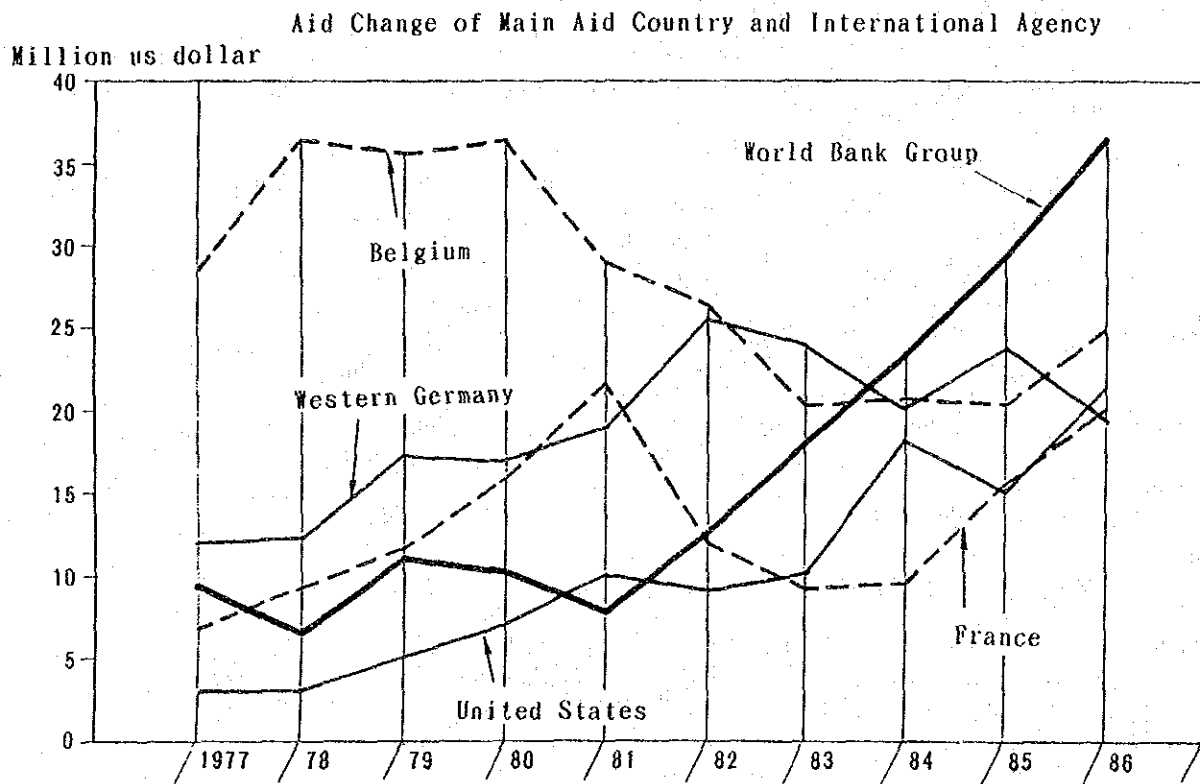
7.1 DEVELOPMENT ASSISTING COUNTRIES

From 1977 to 1986, Rwanda received 1.535 billion US dollars in aid from Development Assisting Countries (DAC) and international organizations. 78% of the amount was grant aid (34% of which was for technical cooperation). The remaining 22% was in loans.

The most aid given by a foreign government was provided by Belgium; they gave 277 million US dollars (28.5% of the total aid). West Germany giving 190 million US\$ (19.5% of the total foreign aid) and France giving 131 million US \$ (13.5%), was the second and third highest contributors, respectively.

Of the international organizations providing aid, the European Community gave the most (171 million US dollars, 30.1% of the total aid). The World Bank was the second highest contributor (164 million US dollars, 29.1% of the total aid).

During the two-year period of 1985 and 1986, the countries, in order of providing aid were Belgium, West Germany, the United States of America, and France. During the same period, the World Bank was the main contributing international organization as shown in following Figure.



7.2 INTERNATIONAL ORGANIZATIONS

International organs which contribute to Rwandan water resources and domestic water supply development are listed below:

- . United Nations Development Program (UNDP)
- . United Nations Children Fund (UNICEF)
- . World Health Organization (WHO)
- . World Bank (IBRD)
- . International Development Association (IDA)
- . African Development Bank (AFDB)
- . European Development Fund (EDF)

- . Bureau Central d'Etudes pour les Equipement d'Outre-Mer(BCEOM)
- . Fonds d'Aide et de Cooperation Francaise (FACF)
- . Association International de Developement Rural of Belgium(AIDR)
- . Japan International Cooperation Agency (JICA)

UNICEF has been providing financial assistance for the development of natural spring water in Rwandan rural areas as well as cooperating in the preparation of the country's nationwide water resources development master plan.

WHO has been providing guidance in the preparation of the country's water qualities and public health and hygienic standards. The World Bank has been financing water supply development projects in the urban areas and has also financed the Comprehensive Study of Existing Water Supply Facilities in the Rural Area (recently completed).

AFDB is cooperating in establishing a chemical manufacturing factory for water treatment and is planning to finance the Pumping Station Construction Project in the Lava Region. AIDR, a Belgian organization, has contributed substantially to the improvement of natural springs in the rural areas.

7.3 JAPAN

(1) Official Development Assistance

Japan has been providing financial assistance for the development of Rwanda. The Development Assistance between 1983 and 1987 by Japan is outlined as below:

(Expenditure Net Amount, Unit: Million Dollar)					
Year	Donation			Government Loan	Total
	Grant Aid	Technical Cooperation	Total		
1983	5.60(1.1)	0.25(0.1)	5.85(0.6)	— (—)	5.85(0.2)
1984	2.20(0.4)	0.87(0.2)	3.07(0.3)	— (—)	3.07(0.1)
1985	1.25(0.2)	0.47(0.1)	1.72(0.1)	-0.08(—)	1.64(0.1)
1986	8.24(1.0)	1.34(0.2)	9.53(0.6)	-0.32(—)	9.26(0.2)
1987	7.13(0.6)	0.82(0.1)	7.95(0.4)	-0.37(—)	7.58(0.1)

Note : Figure in parentheses shows holding rate of total ODA in each form between two countries.

(2) Japanese Grant Aid

The Japanese Grant Aid during 1983 to 1987 is given as Table below. The Rural Water Supply Project in Eastern Region started from 1986.

		Unit: One hundred million yen
Project		
Total Amount		52.45
until 1982		5.86
1983	Medical Facilities Improvement Project	(4.00)
	Food Increased Production Aid	(1.50)
	Debt Relief	(0.36)
		9.36
1984	National Road Improvement Project	(5.00)
	Food Increased Production Aid	(2.00)
	Debt Relief	(0.36)
	Food Aid	(2.00)
		13.40
1985	Food Aid	(3.00)
	Food Increased Production Aid	(3.00)
	Debt Relief	(0.90)
	Public Transport Capacity Reinforcement Project	(6.50)
		11.41
1986	The Rural Water Supply Project in Eastern Region	(4.00)
	Food Increased Production Aid	(3.00)
	Debt Relief	(0.88)
	National Road Improvement Project	(3.53)
		13.64
1987	The Rural Water Supply Project in Eastern Region	(1.78)
	Public Transport Capacity Reinforcement Project (III)	(8.00)
	Debt Relief	(0.86)
	Food Increased Production Aid	(3.00)
Total Amount		106.12
until 1987		

Seventy-two wells were bored under the Phase I Project. One of the wells was provided with a simple water distribution system. The other seventy-one wells were equipped with hand pumps. A rainwater storage facility was also constructed under the Project.

Project construction was conducted over two periods. Details of the construction are shown in the following Table:

	Small Water Supply Area	Medium Water Supply Area	Rain Strage Facility
Unit	21.7 l/person/day	37.2 l/person/day	41.7 l/cap./day
No. of Water Supply Area	71	1	1
Population Supplied	Average 460 person/area	2150 persons	24 persons
Water Consumption	10 ton/day/area	80 ton/day	1 ton/day
Facility	Well with Manual Pump Draining Floor Drain Ditch Protection Fence	Deep Well with Motor Pump Simple Water Supply Facility	Storage Tank

The standard of well and conditions of each well are given in "Data Book".

	Study Area	Contract Quantity	No. of Drilling	Success	Intake System
Phase I	Zone I	1	1	100 %	Motor Pump
	Zone IV	25	29	86 %	Manual Pump
			1 Site		Rain Strage Facility
Sub Total		26	30	87 %	
Phase II	Zone II	14	33	42 %	Manual Pump
	Zone III	18	25	72 %	Manual Pump
	Zone IV	14	14	100 %	Manual Pump
Sub Total		46	72	64 %	
Total		72	102	71 %	

List of Ministries

1. Présidence de la République (Presidency of the Republic)	PRESIREP
2. Ministère de la Défense Nationale (Ministry of National Defense)	MINADEF
3. Ministère des Finances (Ministry of Finance)	MINIFIN
4. Ministère du Commerce et de la Consommation (Ministry of Commerce and Consumption)	MINICOMCON
5. Ministère de l'Agriculture, de l'Elevage et des Forêts (Ministry of Agriculture, Stock Farming and Forests)	MINAGRI
6. Ministère de l'Industrie et de l'Artisanat (Ministry of Industry and Artisans)	MININART
7. Ministère des Travaux Publics, de l'Energie et de l'Eau (Ministry of Public Works, Energy and Water)	MINITRAPEE
8. Ministères des Transports et des Communications (Ministry of Transport and Communications)	MINITRANSCO
9. Ministère de la Santé (Ministry of Health)	MINISANTE
10. Ministère de l'Enseignement Primaire et Secondaire (Ministry of Primary and Secondary Education)	MINIPRISEC
11. Ministère de l'Enseignement Supérieure et de la Recherche Scientifique (Ministry of Higher Education and Scientific Research)	MINISUPRES
12. Ministère de la Jeunesse et du Mouvement Associatif (Ministry of Youth and Association)	MIJEUASSO
13. Ministère de l'Intérieur et du Développement Communal (Ministry of the Interior and Communal Development)	MININTER
14. Ministère de la Fonction Publique et de la Formation Professionnelle (Ministry of Public Function and Professional Formation)	MINIFOP
15. Ministère de la Justice (Ministry of Justice)	MINIJUST
16. Ministère des Relations Institutionnelles (Ministry of the Institutional Relations)	MINIREI
17. Ministère du Plan (Ministry of Planning)	MINIPLAN
18. Ministère des Affaires Etrangères et de la Coopération Internationale (Ministry of Foreign Affairs and International Cooperation)	MINAFFET

Main Crops in Rwanda

Données administratives	
Population au 31.12.1987 :	5 728 148
Superficie disponible (ha) :	1 959 149
Densité (hab/km ²) :	292
Nombre EAF :	243 937

Cultures vivrières						
cultures	superficie récoltée (ha)	rendement (kg/ha)	production (t)	répartition Kcal (%)	répartition protéines (%)	répartition lipides (%)
bananes	243 937	9 275	2 262 596	19,7	6,6	5,4
haricots	325 524	816	265 920	18,1	45,7	15,7
pois	31 283	625	19 567	1,3	3,5	0,8
arachides	21 300	762	16 233	1,0	1,6	16,0
soja	9 405	736	6 928	0,5	1,8	4,3
sorgho	155 935	1 203	187 686	12,8	11,8	3,4
maïs	80 429	1 121	90 182	6,5	6,7	14,9
éleusine	935	540	505	0,0	0,0	0,0
froment	5 840	1 077	6 294	0,3	0,5	0,4
riz	3 184	2 066	6 581	0,3	0,2	0,0
patates douces	125 905	6 975	878 191	21,3	11,0	6,8
pomme de terre	38 520	7 148	275 377	3,5	2,8	0,8
manioc	53 745	9 278	498 653	11,4	2,2	3,2
colocases	6 470	6 005	38 857	0,6	0,4	0,1
ignames	927	5 923	5 491	0,1	0,0	0,0
subtotaux	1 103 339			98,0	95,6	72,5

Elevage						
catégories	nombre	produit	production (kg)	répartition Kcal (%)	répartition protéines (%)	répartition lipides (%)
bovins	579 106	viande	7 586 288	0,4	0,9	5,8
		lait	27 860 789	0,4	0,8	6,3
caprins	1 015 727	viande	7 181 189	0,2	1,0	3,2
ovins	357 455	viande	2 066 089	0,0	0,2	0,9
porcins	104 553	viande	7 925 117	0,5	0,8	10,0
lapins	203 440	viande	258 368	0,0	0,0	0,0
volaille	1 189 745	viande	1 629 950	0,0	0,2	0,6
		oeufs	856 616	0,0	0,0	0,3
ruches	212 094	miel	636 282	0,0	0,0	0,0
subtotaux				1,9	4,3	27,4
totaux				100,0	100,0	100,0

Kcal/habitant,jour :	2 127	Protéines, g/hab,jour :	54	Lipides, g/hab,jour :	10
Kcal, % besoins :	101	Protéines, % besoins :	92	Lipides, % besoins :	27

Caféiculture			
Nombre de planteurs :	658 429	Total production parche (kg) :	39 947 160
Nombre de caféiers :	100 406 382	Production par planteur (kg) :	60
Caféiers par planteur :	152	Production par plant (g) :	397

Source : PRODUCTION AGRICOLE EN 1987 (MINAGRI)

Exports and Imports of 1980 to 1986
(En millions de FRW constants 1980)

Exportations FOB

Produit	1980	1981	1982	1983	1984	1985	1986
Café (FOB Kagitumba)	5.197	5.863	4.976	5.088	5.300	5.512	5.712
Thé	1.040	945	1.125	1.160	1.190	1.230	1.270
Pyrèthre	150	130	160	190	230	265	315
Quinquina	279	160	160	280	320	360	440
Peaux	280	240	250	250	250	250	260
Cassitérite ou Etain	1.785	1.390	1.595	1.810	2.060	2.350	2.570
Wolfram ou Ferro-tungstène	510	400	400	430	450	490	520
Divers minéraux	174	270	280	280	250	300	310
Divers enregistrés	131	130	130	130	130	530	1.130
Autres non enregistrés et ajustements	2.856	1.640	950	950	950	950	950
TOTAL EXPORTATIONS FOB	12.402	11.168	9.936	10.578	11.190	12.347	13.529

Importations CIF

Biens de consommation avec licence	8.088	8.484	8.100	8.400	8.710	9.030	9.370
Biens de consommation sur aide	655	655	655	655	655	655	655
Carburants avec licence	2.519	3.300	3.420	3.650	4.290	4.610	4.960
Carburants sur aide	270	360	390	420	450	490	530
Biens intermédiaires avec licence	3.259	3.170	3.390	3.230	3.000	3.250	3.550
Biens intermédiaires sur aide	627	627	650	675	700	725	750
Biens d'équipement avec licence	2.184	2.000	2.140	2.290	2.450	2.620	2.800
Biens d'équipement sur aide	4.955	5.087	5.280	5.480	5.700	5.910	6.135
Autres biens enregistrés	742	742	770	800	830	860	890
Autres biens non enregistrés et ajustements	2.355	1.640	950	950	950	950	950
TOTAL IMPORTATIONS CIF	25.666	26.065	25.745	26.750	27.735	29.110	30.590
TOTAL IMPORTATIONS FOB	18.177	18.005	17.563	18.236	18.050	19.820	20.810

Source: The Third National Development Plan (1982-1986)

Index of Consumer Price against 1983 (between 1984 and 1988)

PRODUITS \ PERIODE	Moyenne 1984	Moyenne 1985	Moyenne 1986	1987 Moyenne Annuelle	1988 Sept.
1. PRODUITS ESS. IMPORTES					
Alimentation	106,42	106,74	105,45	108,47	134,00
Habillement	115,05	118,45	119,90	128,06	134,29
Entretien ménager	128,50	132,98	119,29	123,80	120,85
Soins médicaux	91,08	94,54	92,54	90,44	89,69
Autres soins & hygiène	100,87	103,62	104,06	102,89	96,47
Logement	79,28	80,09	79,57	79,64	79,17
Transports et déplacements	99,95	100,09	99,32	99,44	100,86
INDICE GENERAL	107,90	109,31	107,47	110,58	125,25
2. PRODUITS ESS. MIXTES					
Boissons & tabacs	106,31	106,41	106,12	106,44	108,32
Habillement	116,28	105,13	99,91	99,58	88,66
Entretien ménager	105,53	106,23	109,46	108,18	108,08
Autres soins et hygiène	108,92	108,92	122,40	128,73	128,73
Logement	97,31	99,31	100,39	100,67	107,49
INDICE GENERAL	105,50	105,50	106,58	107,40	109,39
3. PRODUITS ESS. LOCAUX					
Alimentation	128,47	127,42	105,77	120,08	130,06
Boissons & tabacs	109,28	116,36	121,42	121,42	121,42
Entretien ménager	110,96	124,79	126,29	130,70	118,83
Soins médicaux	100,00	100,00	100,00	100,00	100,00
Logement	104,94	107,00	111,11	111,11	98,76
Transports et déplacements	111,65	111,65	111,65	111,65	105,14
Divers	103,13	103,98	103,98	104,41	106,09
INDICE GENERAL	120,63	122,93	110,15	119,88	123,36
4. TOUS PRODUITS ESSENTIELS					
Alimentation	121,85	121,21	105,67	116,60	131,22
Boissons & tabacs	106,60	107,32	107,51	107,81	109,51
Habillement	115,24	116,32	116,70	123,50	126,98
Entretien ménager	113,63	125,62	124,66	129,00	118,87
Soins médicaux	94,90	96,76	95,74	94,54	94,11
Autres soins et hygiène	104,97	106,32	113,39	116,03	112,87
Logement	97,20	99,20	100,31	100,58	106,68
Transports et déplacements	106,35	106,41	106,06	106,12	103,20
Divers	103,13	103,98	103,98	104,41	106,09
INDICE GENERAL	114,39	116,57	108,87	115,10	121,01

Consumer Price in 1990 and 1991 at KIGALI

Table A.5

Exchange Rate 1 \$ = FR 80
(May 1990)

Exchange Rate 1 \$ = FR 128
(Jul. 1991)

			Before Deval.		After Deval.			
No	Item	unit	FRW	In US \$	FRW	up %	In US \$	up %
(for construction)								
1	Cement	Ton	260.000	3.250.0	320.000	123	2.500.0	77
2	Re-Bar	Ton	112.560	1.407.0	150.080	133	1.172.5	83
3	Sand	m3	500	6.3	500	100	3.9	63
4	Gravel	m3	1.000	12.5	1.150	115	9.0	72
5	Brick	pc	3	0.0	5	167	0.0	104
6	Common worker	Day	100	1.3	120	120	0.9	75
7	Paint(EP)	lt	360	4.5	530	147	4.1	92
8	Glass t=3mm	m2	1.240	15.5	1.800	145	14.1	91
9								
10	Gasolin	Lt	70	0.9	125	179	1.0	112
11	Diesel	Lt	67	0.8	120	179	0.9	112
12								
(Food)								
13	Rice	Kg	110	1.4	124	113	1.0	70
14	Beans	Kg	30	0.4	55	183	0.4	115
15	Irish Potato	Kg	11	0.1	22	200	0.2	125
16	Haracula Juice	btl	380	4.8	450	118	3.5	74
17	Egg	pc	14	0.2	15	107	0.1	67
18	Nido-milk	kg	320	4.0	450	141	3.5	88
19	Cooking oil chief	lt	167	2.1	230	138	1.8	86
20	Sugar	Kg	90	1.1	140	156	1.1	97
21	Salt	Kg	360	4.5	420	117	3.3	73
22	Poulet -chicken	pc	500	6.3	600	120	4.7	75
23	Tomato	Kg	30	0.4	45	150	0.4	94
24	Banana	pc	5	0.1	6	120	0.0	75
25	Onion	Kg	70	0.9	80	114	0.6	71
26	Beer	btl	83	1.0	86	104	0.7	65
27	Fanta	btl	23	0.3	29	126	0.2	79
28	Coffee	pkt	210	2.6	280	133	2.2	83
(Daily necessities)								
29	Liquid soap	lt	115	1.4	130	113	1.0	71
30	Omo small	pkt	40	0.5	60	150	0.5	94
31	Toilet paper	roll	60	0.8	110	183	0.9	115
32	Cooking gas(small)	pc	820	10.3	1.390	170	10.9	106
33	Bath Soap	pc	40	0.5	55	138	0.4	86
34	Plate	pc	250	3.1	400	160	3.1	100
35	Bed Sheet	pc	2.300	28.8	4.800	209	37.5	130
36	Sport Shoes	pc	4.500	56.3	7.500	167	58.6	104
(others)								
37	H.Hille collines	Day	7.500	93.8	11.250	150	87.9	94
38	H.Heridian	Day	6.800	85.0	11.550	170	80.2	106
39	Fax from PIT (A4)	page	200	2.5	200	100	1.6	63
40	Telephone	Hln	3.3	0.0	3.3	100	0.0	63
41	Water	m3	0.8	0.0	0.8	100	0.0	63
42	Electricity	Kwt	8.5	0.1	8.5	100	0.1	63
43	Copy paper	Llm	1.500	18.8	1.950	130	15.2	81
44	Film (24nos)	pc	500	6.3	560	112	4.4	70
45	Taxi (Kigali)		20	0.3	30	150	0.2	94

Annual Expenditure of Each Ministry (1983-1987)

Name of Ministries	1983	1984	1985	1986	1987
PRESIREP	745.0	991.9	942.6	1,013.4	1,196.5
CONSEIL NATIONAL DE DEVELOPPEMENT ?	94.6	114.8	118.9	116.9	124.7
MINADEP	2,692.7	2,551.8	2,759.2	3,081.0	2,907.0
MININTER	427.7	412.8	382.0	410.4	428.6
MINAFFET	1,141.4	1,168.8	1,161.0	1,409.3	1,158.1
MINIFIN	1,603.9	-	-	-	-
MINIJUST	749.2	954.0	1,026.2	989.4	1,029.9
EDUCATION	4,491.3	4,887.4	5,036.7	5,801.5	5,977.7
MINIPRISEC	(3,910.2)	(4,252.8)	(4,315.1)	(5,076.2)	(5,258.0)
MINISUPRES	(581.1)	(634.6)	(721.6)	(725.3)	(719.7)
MINIPLAN	89.2	94.9	109.5	104.8	110.8
MINIFOP	71.6	68.7	92.2	94.4	106.0
MINITRANSCO	380.0	445.1	424.0	408.5	381.9
MINISANTE	862.0	-	-	-	-
MINAGRI	821.9	725.0	841.4	972.9	949.6
SOCIAL WORK	241.3	-	-	-	-
MINITRAPEE	1,162.1	1,200.5	1,188.8	1,557.1	1,909.4
YOUTH SPORTS	141.9	-	-	-	-
NATURAL RESOURCE	173.1	-	-	-	-
MINICOMON	77.5	-	-	-	-
INSURANCE	-	1,059.8	1,256.1	1,311.6	1,399.3
MINIREI	-	16.1	10.2	10.9	10.5
MIJEUASSO	-	217.1	244.5	236.1	289.1
MININART	-	136.6	151.2	190.0	238.2
FINANCE AND ECONOMIC	-	-	1,912.5	2,395.4	2,484.6
Total	15,966.4	16,551.0	17,657.0	20,103.6	20,702.0

Source : MINIFIN

Table A.7

MACROECONOMIC INDICATOR

Indicator	1984	1985	1986	1987	1988	1990 Oct	1990 Nov	1991 Aug
GDP at market price FRW (billion)	158.9	173.3	161.9	166.5				
Real GDP growth %	0.7	7.5	-2.0	-1.0	2.0			
Consumer price inflation %	5.4	1.7	-1.1	4.1	2.9			
Population (million)	5.90	6.10	6.31	6.53	6.75			
Export FOB (million US\$)	144.7	130.6	187.9	112.3	108.4			
Import CIF (million US\$)	278.2	298.7	349.4	351.7	369.7			
Current account (million US\$)	-41.6	-64.0	-69.2	-134.3	-119.0			
Reserves excl gold (million US\$)	106.9	113.3	162.3	164.2	118.3			
Public external debt disbursed (million US\$)	254.4	327.8	413.6	544.4				
Debt service ratio %	5.3	8.9	7.5	11.3				
Green coffee production 1000 tons	39.2	40.1	40.9	42.1	43.9			
Exchange rate FRW per US\$	100.2	101.3	87.6	79.7	76.5	71.8	118.7	128.2

Source : EIU Country Report 1989

Original GDP 1987		Components of GDP 1987	
Agriculture	37%	Private consumption	81.4%
Industry	23%	Public consumption	11.9%
(Manufacture)	(16%)	Gross fixed capital formation	15.4%
Services	40%	Change in stocks	0.2%
		Exports of goods & services	9.7%
		Imports of goods & services	-19.6%
Total	100%	Total	100.0%

Principal exports 1988	
Coffee	85.6 (million US\$)
Tea	14.2 (million US\$)

Principal imports 1988	
Petroleum	85.6 (million US\$)

GDP per capita	
1985	283.0 US\$
1986	259.6 US\$
1987	306.9 US\$

POPULATION INDEX IN RWANDA

Item	RWANDA	BURUNDI	ZAIRE	UGANDA	AFRICA	WORLD	JAPAN
Area(10,000km ²)	2,495	2,565	226,760	19,971	2,954.6	13,078.9	37,643
Population Density	278.1	206.2	14.9	89.1	22.1	39.5	327.5
Average Annual							
Population Change							
1965-70	3.05%	1.45%	2.11%	3.95%	2.62%	2.04%	1.07%
1975-80	3.31%	1.80%	2.86%	3.19%	2.97%	1.75%	0.93%
1985-90	3.36%	2.84%	3.04%	3.49%	3.02%	1.63%	0.51%
Crude Birth Rate							
1965-70	50.6	46.5	47.0	49.1	47.7	33.9	17.8
1985-90	50.7	45.7	44.8	50.1	45.2	26.0	12.3
Crude Death Rate							
1965-70	20.2	25.0	20.5	18.7	21.5	13.3	6.9
1985-90	17.2	17.4	14.5	15.4	15.1	9.9	7.2
Total Fertility Rate							
1965-70	7.00	5.83	5.98	6.91	6.60	4.86	2.02
1985-90	7.31	6.31	6.09	6.90	6.22	3.28	1.83

Source : World Resources 1988-89 (United Nations Environment Programme)

Table A.9

ELECTRIC, WATER SUPPLY, GAS: PRODUCTION, CONSUMPTION, FEE (1983-1987)

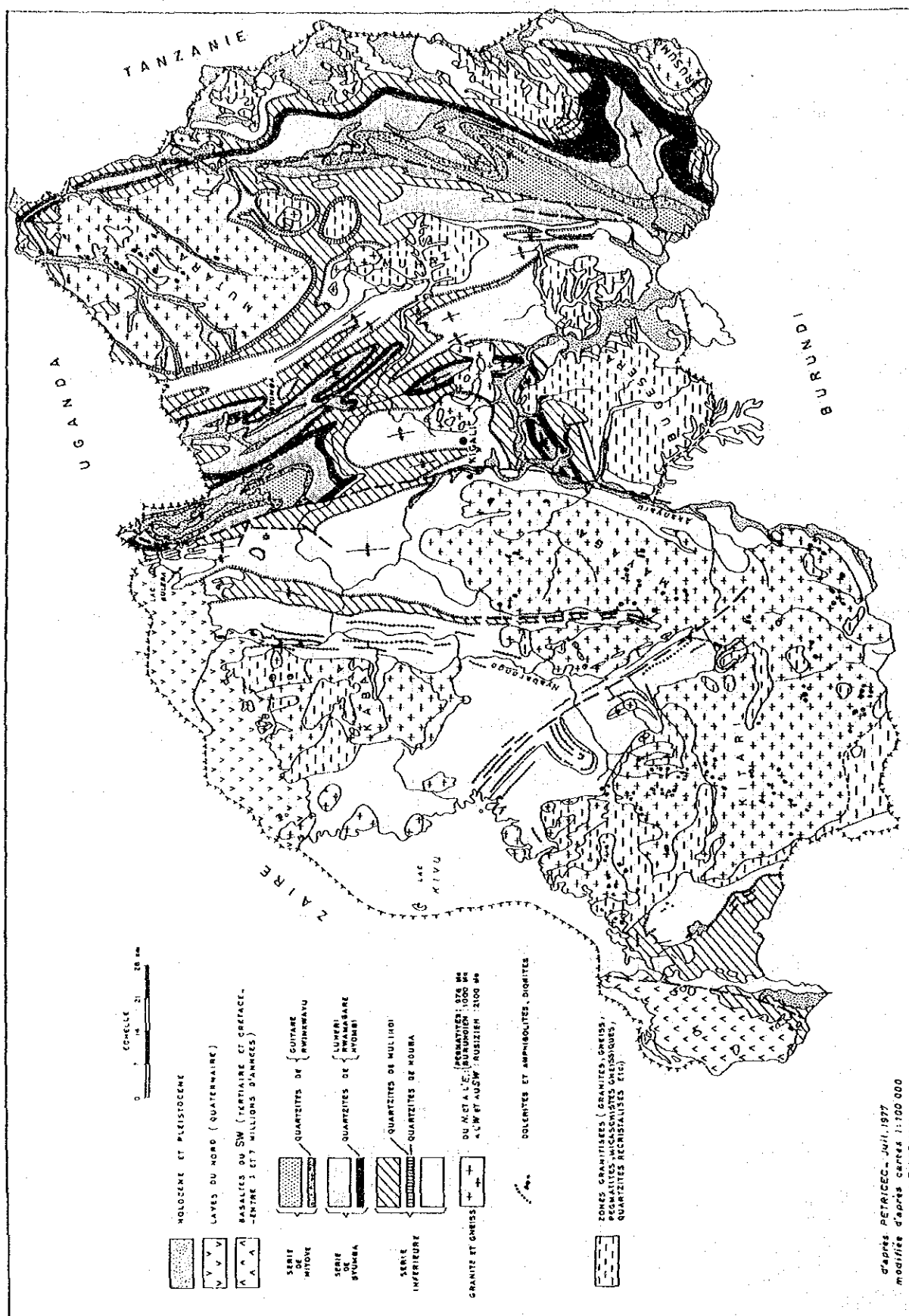
	1983	1984	1985	1986	1987
I. Production Consumption					
1. Electric(1,000kwh)					
Demand	98.00	104.80	110.67	116.81	127.26
Home Production	85.60	93.98	90.00	94.96	108.47
Hydraulic Power	(85.42)	(93.90)	(90.00)	(94.65)	(108.35)
Thermal Power	(10.18)	(0.08)	(—)	(0.31)	(0.12)
Import	12.40	10.90	20.70	21.85	18.79
Consumption	75.40	83.90	92.40	95.04	105.25
Home Production/Consumption(%)	113.53%	111.92%	97.40%	99.9%	103.06%
2. Water Supply(1,000,000m3)					
Production	5.41	5.97	5.79	6.87	8.21
Consumption	4.24	5.04	5.31	5.79	6.29
Production/Consumption Rate	128.5%	118.5%	109.0%	118.65%	130.50%
3. Methane Gas					
Production(1,000m3)	435.30	550.5	1,029.83	1,075.32	955.28
Consumption(1,000m3)	435.30	550.5	1,029.83	1,075.32	955.28
II. Number of Member					
1. Electric	6,945	7,691	9,051	10,694	13,517
2. Water Supply	5,149	6,888	7,620	8,615	10,613
3. Gas	1	1	1	1	1
III. Fee					
1. Electric					
Basic Voltage(FRW/kwh)	11-13	11-13	11-13	11-13	11-13
Midium and High Voltage until 100kwh	9.0	9.0	9.0	9.0	9.0
More than 100kwh	5.5	5.5	5.5	5.5	5.5
2. Water Supply					
0~25m3	40	40	40	40	40
26~60m3	60	60	60	60	60
More than 60m3	80	80	80	80	80

Table A.10

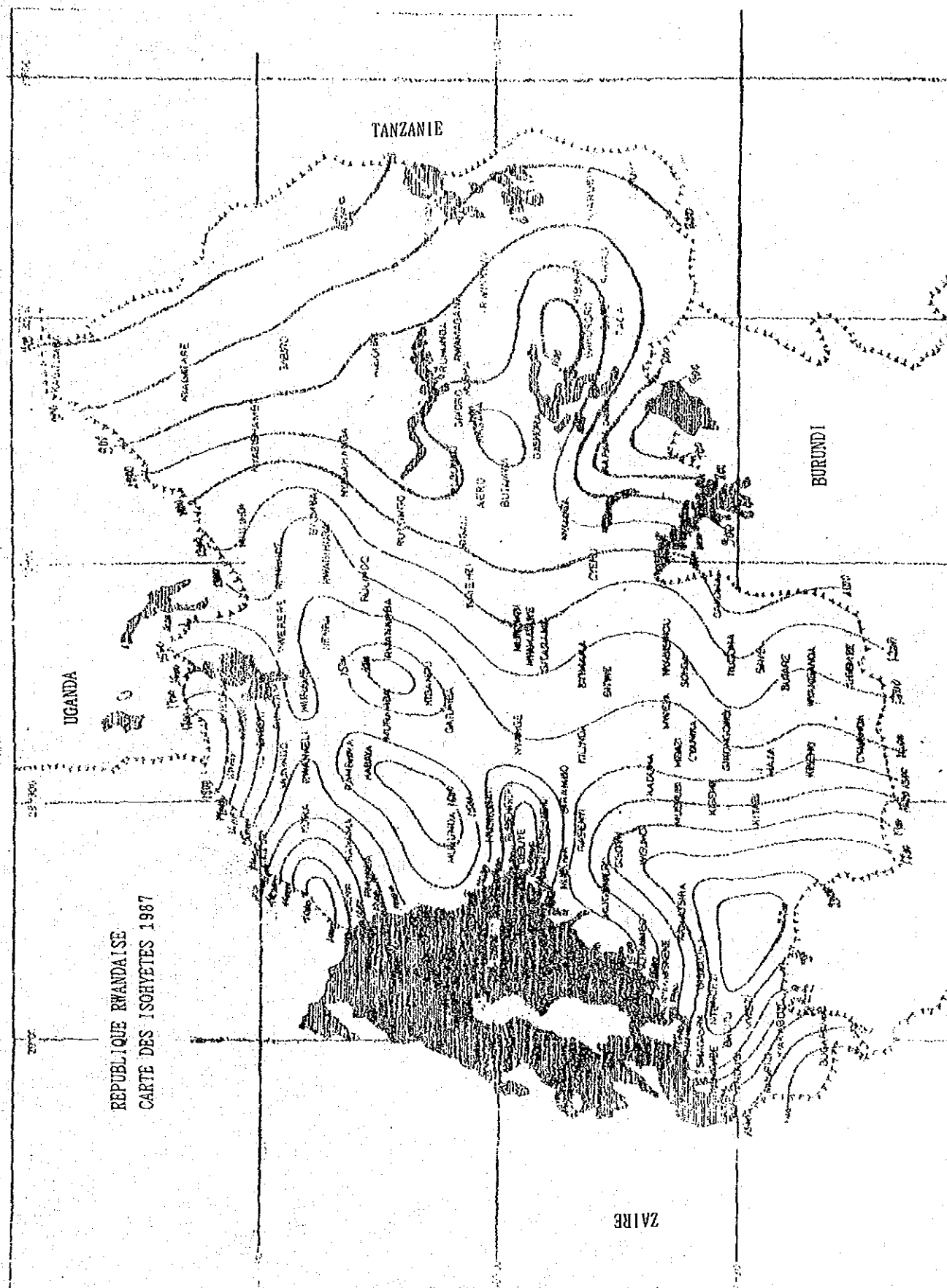
CLASSIFICATION OF PUBLIC HEALTH BASIS FACILITIES

District under Jurisdiction	Hospital		Health Center		Dispensary		Maternity Hospital		Nutrition Center		Nurses Training School		Sanatorium		Leprosy Hospital		Mental Handicapped Person Institution		Orphanage		Protective Institution		Preschool Education		Children's Institution Total
	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	
KIGALI	3	1	25	11	4	0	0	1	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	57
GITARAMA	0	2	13	6	7	1	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	1	0	44
BUTARE	3	1	8	14	7	2	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	2	7	7	2
GIKONGORO	0	1	8	9	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYANGUGU	1	2	3	5	6	1	0	0	3	7	6	0	0	0	0	0	0	0	0	0	0	0	1	28	63
KIBUYE	1	3	2	12	0	2	0	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	1	26
GISENTI	2	1	10	4	3	7	0	2	12	6	2	1	0	0	1	0	0	0	2	0	1	0	1	2	58
RUHengeri	1	1	13	7	6	1	0	0	7	8	0	0	0	0	0	0	0	0	1	0	3	0	1	0	51
BYUMBA	3	1	12	6	9	0	0	1	0	3	0	1	0	0	0	0	0	0	3	0	2	0	2	0	43
KIBUNGO	3	1	8	3	6	0	0	0	0	3	9	2	1	0	0	0	0	0	1	0	0	1	1	1	42
Sub Total	18	14	102	77	49	15	0	4	27	45	24	6	1	0	1	0	6	6	7	0	6	12	41	1	455
Total	32	179	84	4	4	72	30	1	1	1	6	7	6	53	455										53

Source : MINISANTE 1988



Geological Map In Rwanda



Isohyets Map of Rwanda