

CHAPTER I

CHARACTERISTICS OF AGRICULTURE AND RURAL AREAS IN RWANDA

1. Topography and Climate

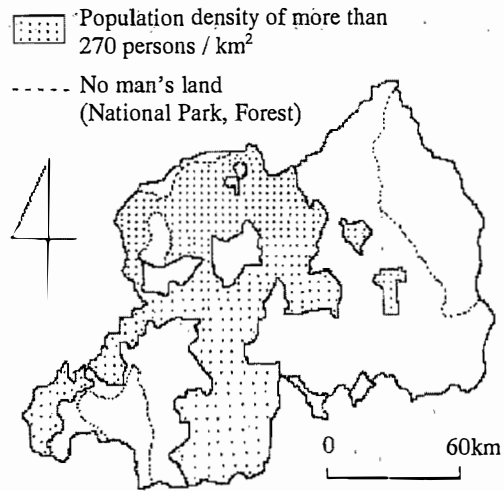
As a geographer, Bart [1993: 1] summarizes the peculiarity of Rwanda in three points: firstly, a narrow territory of 26,338 square kilometers composed exclusively of highland; secondly, the population dwelling almost entirely in rural areas; thirdly, the considerably high population density. Rwanda is a tiny rural state with a high population density. The central part of the state is situated at an altitude of 1,500 – 2,500 meters. The agriculture in this country depends generally on rainwater.

Rwanda, like Burundi, is situated in the eastern area of West Rift Valley. The nearest part to the Rift Valley, namely the western part of the country near Lake Kivu, lies at the highest altitude: Crête Zaire-Nil. The altitude in this area often exceeds 2,000 meters, but the eastern part of the territory is lower: 1,500 – 1,900 meters in the central part of the country, in which the center of the Kingdom of Rwanda was situated, and 900 – 1,500 meters in the eastern area near to Tanzania. Rwanda and Burundi are often called “the lands of the thousand hills.” This expression fits in well with the central region, where countless hills extend as far as the eye can see. Rwandan peasants use these hills intensively: a third of total cultivated land lies on a slope of more than 20% (Bart [1993: 28]).

The Rwandan climate is conditioned by this landscape: the further to the west, the lower the altitude, the warmer the temperature, and the lesser the precipitation. As Figure 1.1 and 1.2 show, the area with the highest population density is almost included in the area with 1,000-1,600 millimeters precipitation, namely the most suitable area for agriculture. The rainfall between June and August is much less than that in other months all over the territory. The period for cultivation can be divided between the first cultivable season (from September to January: season A) and the second cultivable season (from February to June: season B). Table 1.1 indicates the principal products of each season. While bananas are planted all the year round, haricot and sorghum are particularly important produces in season A and season B, respectively.

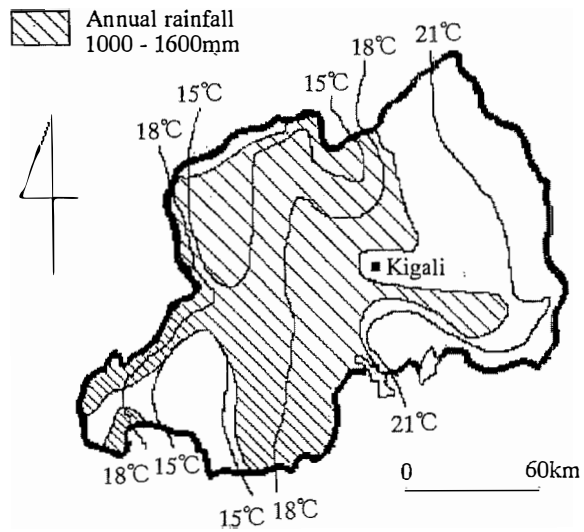
As for the relationship between the altitude and agriculture, the most suitable zone for agricultural production is situated between 1,500 meters and 1,700 meters. The

Figure 1.1
High-population-density Area in Rwanda



Source: Bart [1993: 41].

Figure 1.2
Annual Average Temperature and Rainfall



Source: Bart [1993: 41].

climate there is the most suitable for many plants: banana, haricot, sweet potato, soybean, avocado, coffee, tobacco, etc. Sugar cane and paddy are fitting for the zone under 1,400 meters, where rainfall and rich soil are often in short. As for plants such as maize, Irish potato, green peas and wheat, all are suited to the highlands at more than 2,000 meters.

Table 1.1
Rwandan Main Crops by Season

Season A (Sep - Jan)		Season B (Feb - Jul)	
Crop	Proportion	Crop	Proportion
Haricot	35.6	Sorghum	23.7
Banana	22.1	Haricot	19.6
Sweet Potato	7.9	Banana	19.1
Maize	6.9	Sweet Potato	8.3
Cassava	6.9	Cassava	7.4
Coffee	5.4	Coffee	5.8
Sorghum	3.7	Maize	4.4
Irish Potato	2.9	Green Pea	2.9
Green Pea	1.7	Irish Potato	0.9
Groundnut	0.6	Groundnut	0.5
Soybean	0.1	Wheat	0.4
Wheat	0.1	Soybean	0.1
Others	6.1	Others	6.9
Total	100.0	Total	100.0

Source: Bart [1993: 49].

Table 1.2
Population and Population Density
by Prefecture in Rwanda

Prefecture	Population	Area(km ²)	Population Density
Butare	762,735	1,837	415
Byumba	782,230	4,761	164
Cyangugu	514,279	1,845	279
Gikongoro	466,576	2,057	227
Gisenyi	734,690	2,050	358
Gitarama	851,288	2,189	389
Kibungo	651,887	4,046	161
Kibuye	471,066	1,705	276
Kigali	913,481	3,002	304
Kigali-ville	232,733	116	2,006
Ruhengeri	767,531	1,663	462
Total	7,148,496	26,338	271

Source: République Rwandaise, Service National de Recensement [1991].

As plants suitable for cultivation are different according to the altitude, the commerce of agricultural products between the highlands and lowlands has been promoted. Inter-regional exchange of the products was therefore active in Rwanda, even in the pre-colonial period.¹ In these days, however, the population growth and extension of cultivated land is causing cultivation without considering the characteristics of plants; banana, for example, is often planted at an altitude of 2,200 meters and more.

2. Population

Figure 1.3 shows the evolution of the population in Rwanda. The population, which was estimated to be around one million at the beginning of the 20th century, has since continued to grow, except during the periods of World War II and of the genocide in 1994. It reached three millions at independence, and seven millions in the 1990s. As for the growth rate of the population, it has been from 2 to 3% per year since independence. Although the civil war and genocide caused a drastic decrease in the population in 1994, it is now increasing remarkably because of the return of refugees in addition to the natural increase.

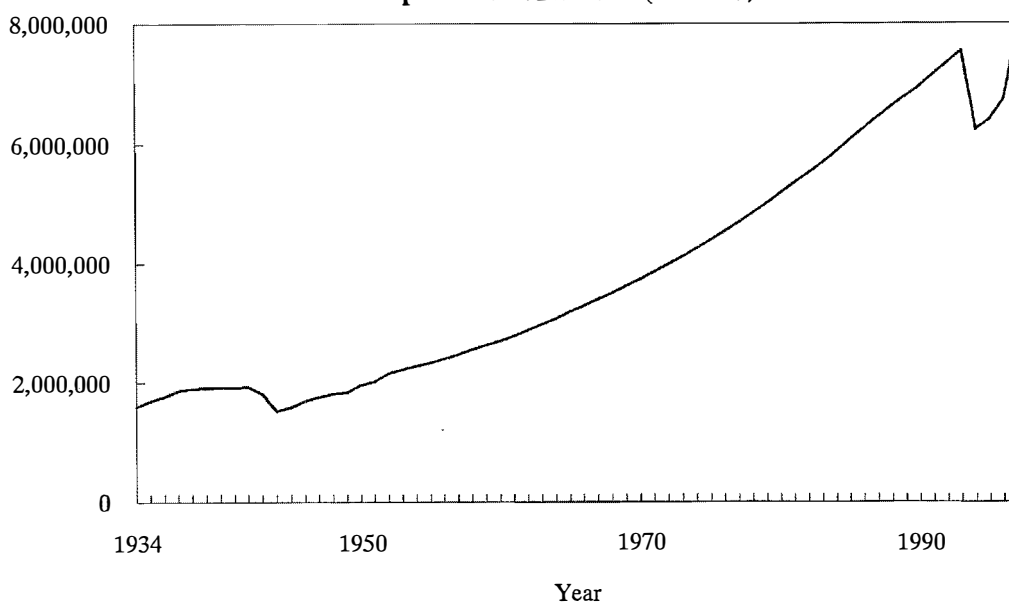
The population density, calculated from total population at the beginning of the 1990s and total area of the country, is about 270 per square kilometer. Being certainly more than 300, if calculated from the area of cultivable land, this is undoubtedly the highest level in Africa. The population is not equally spread throughout the territory. At the beginning of the 20th century, the Rwandan population was concentrated in such areas as the central plateau and around Lake Kivu (Bart [1993: 75]). After independence, the population has migrated to sparsely inhabited areas such as the eastern part of the country and Bugesera. Nevertheless, as Table 1.2 shows, according to the provisional census in 1991, the population density differs by more than two times among the prefectures: from 161 (Kibungo prefecture) to 415 (Butare prefecture). Even today, the population density is the highest in the central plateau, where the center of the Kingdom of Rwanda was situated.

Another important characteristic of the Rwandan population is that its overwhelming numbers lives in rural areas: urbanization has not yet been developed. The proportion of the urban population was only around 5% in 1991. In this sense, Rwanda

¹ The traditional Rwandan notion of locality has a sense of distinction between lowland (*mayaga*) and highland (*rukiga*). The former term signifies “hot land,” while the latter means “cool land.”

could be regarded as a huge village.

Figure 1.3
Population of Rwanda (1934-97)



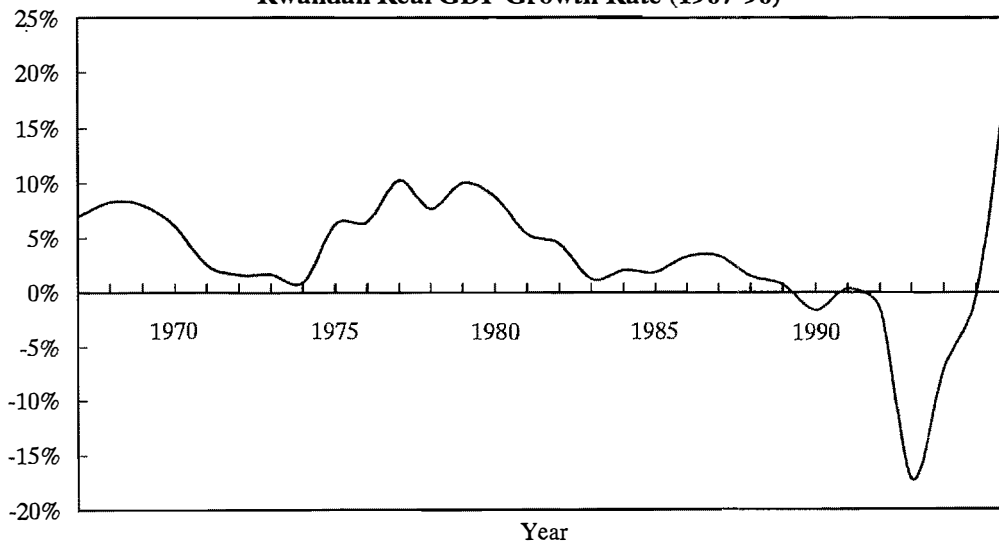
Sources: 1934-64: République Rwandaise, Office National de la Population [1990: 15].
1965-97: World Bank [1999].

Nevertheless, the term “village” may cause a misunderstanding in the Rwandan context, as settlements are generally dispersed in rural Rwanda. If the term “village” means a group of houses in a rural area, there was no “village” in traditional Rwanda. Typical scenery in this country is that of hills cultivated up to their tops and dotted with a few small houses. Researchers have tried to explain this particular way of dwelling. Someone claimed that the reason was to make houses in close proximity to fields. According to this assertion, such location was necessary because movement is not easy in the mountainous topography. Others insisted that political domination by the Tutsi had influenced the way of settlement (Guichaoua [1989: 42]). However, none of these explications seems to be entirely persuasive. We should confine ourselves to the fact that settlement has been scattered in rural Rwanda, and that the government considers that it needs to be corrected. This latter point, the policy of villagization, will be treated later.

3. Agricultural Sector in the Rwandan Macro-economy

We explain in this section some characteristics of the Rwandan macro-economy and agricultural sector. Figure 1.4 indicates the evolution of real GDP growth rate (indicated by the moving average method in three years). As the Table shows, the rate of real economic growth was very low at the beginning of the 1970s. After the remarkable growth from the late 1970s to the mid 1980s, it declined thereafter to a level lower than the annual population growth rate. In the 1990s, the Rwandan economy became catastrophic because of the civil war and genocide. Such an evolution of GDP corresponds to the political situation. Economic stagnation at the beginning of the 1970s brought about the downfall of the Kayibanda regime in 1973; the Habyarimana regime, supported at first by the stable economy, also weakened from the mid-1980s in accordance with the economic crisis. As for the 1990s, it is not necessary to explain the relationship between the economy and the political situation.

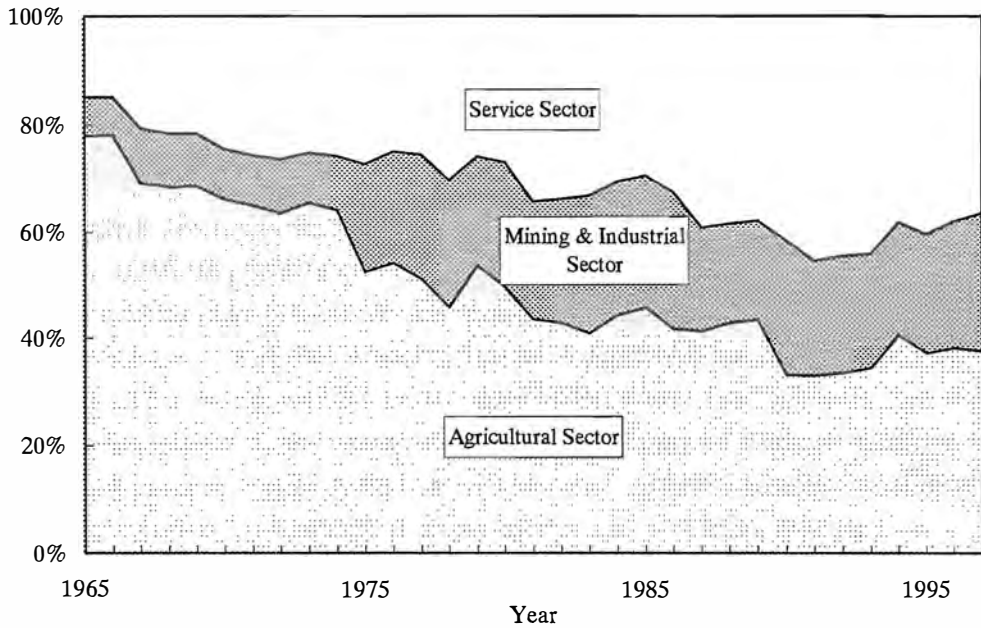
Figure 1.4
Rwandan Real GDP Growth Rate (1967-96)



Source: World Bank [1999].

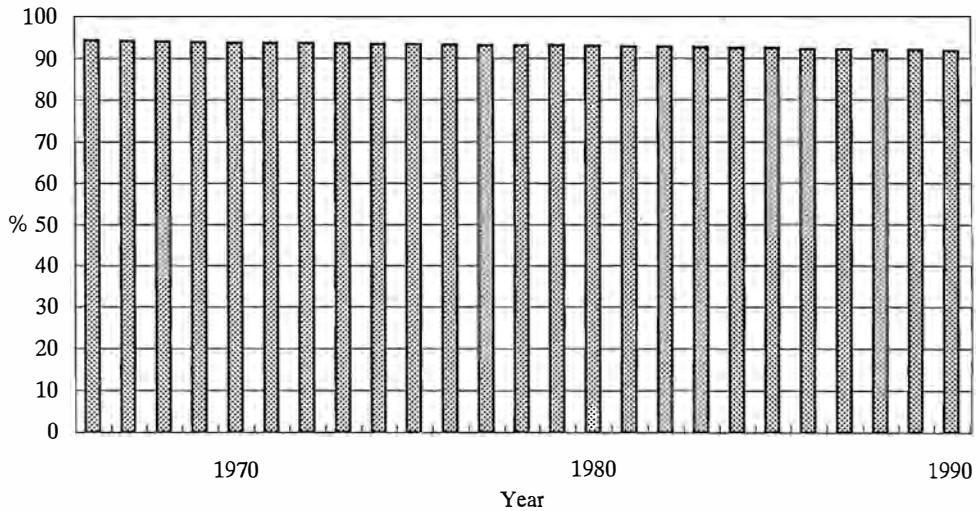
As the Rwandan economy was generally stagnant after independence, its GDP per capita has always been around 250 – 350 US dollars. According to UNDP statistics, Rwandan GDP in real terms per capita is the lowest in the world; as for the human development index, taking such factors into account as the expected average life at birth,

Figure 1.5
Proportion of Economic Sectors in Rwandan GDP (1965-97)



Source: World Bank [1999].

Figure 1.6
Proportion of the Working Population in the Agricultural Sector (1966-90)



Source: World Bank [1999].

literacy rate and enrollment rate, it is the second lowest after Sierra Leone (UNDP [1997]). Not only economic development, but also human development is now in danger in Rwanda.

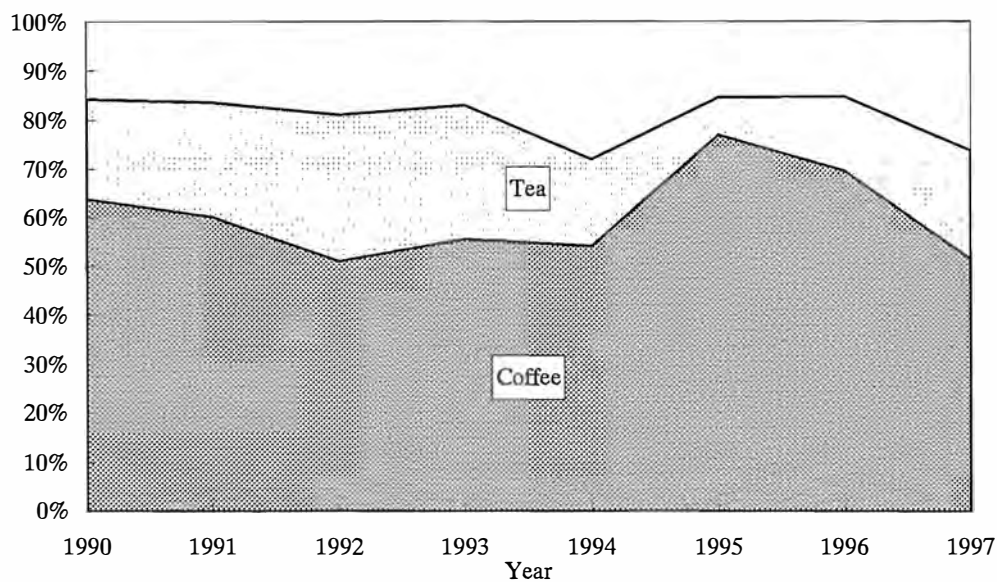
Figure 1.5 indicates the composition of the three economic sectors in GDP. It shows that the proportion of the agricultural sector has continued to decline. The share of the agricultural sector, which occupied around 80% of GDP at the beginning of the 1960s, is less than 40% today. Although the proportion of the agricultural sector in GDP has declined, its importance in employment has not changed at all. As shown in Figure 1.6, the agricultural sector still employs more than 90% of the total labor population.

If we examine the Rwandan industrial and service sectors in detail, it is clear that their structures are not developed. Almost all industrial activities are composed of the “food and beverage” and “construction” sub-sectors. Moreover, the most important activity in the “food and beverage” sub-sector is beer production, in which production by the traditional method and that by the modern method are in almost the same proportion. The most important activity in the service sector is “commerce,” namely retail and wholesale activities (République Rwandaise, Ministère des Finances et de Planification Economique, [1998]). It is unlikely that these activities will become leading sectors for sustainable development. The engine of economic growth for Rwanda has always been the export of primary products. As can be seen in Figure 1.7, the proportion of coffee, the most important of export goods, exceeded 50% of the total export value every year in the 1990s. If the export of tea is added to that of coffee, the proportion even exceeded 80%.

The Rwandan economic crisis is closely related to that of the agricultural sector. Figure 1.8 shows the evolution of added-value growth rate in the agricultural sector. The growth rate, having increased up to the beginning of the 1980s, thereafter stagnated. There are at least two reasons to explain the stagnation of the agricultural sector. At first, the price of coffee in the world markets fell sharply in the 1980s. As shown in Figure 1.9, the coffee price at the beginning of the 1990s was less than one third of that in the mid-1980s. This sudden decrease in coffee price, in addition to the fall of other export goods such as tin, triggered the Rwandan economic crisis.

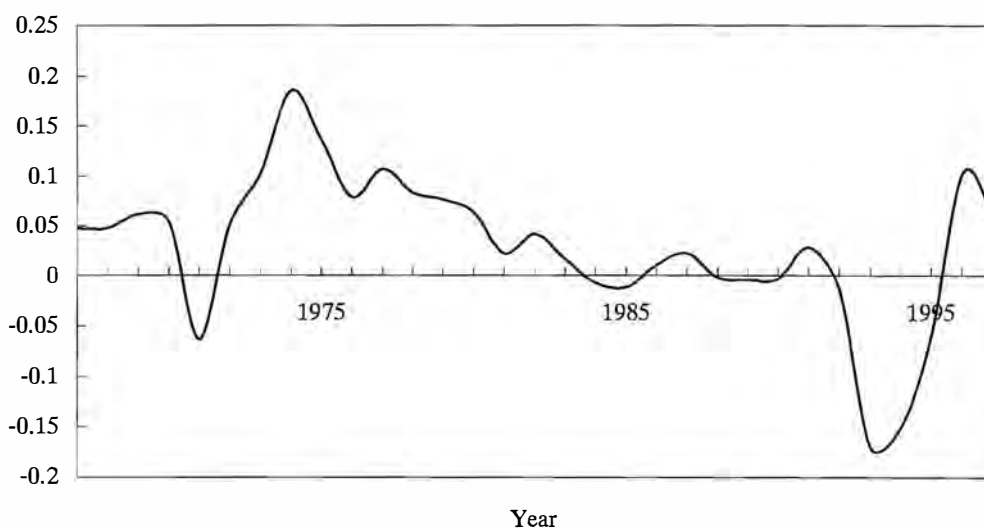
Secondly, some researchers insist that the Rwandan agricultural production system had reached its limit before the 1980s, thus causing the stagnation of food production. Rwanda experienced a serious food shortage at the end of the 1980s, especially in southern prefectures. André [1997] has pointed out that the cause of this food shortage could be attributed to the limit of land utilization. She argued that, although the agricultural method with intensive land use has developed in Rwanda, it could no longer work in the 1980s because of the excessive land fraction. The average growth rate

Figure 1.7
Proportion of Coffee and Tea to the Total Value of Rwandan Exports



Source: République Rwandaise, Ministère des Finances et de Planification Economique [1998].

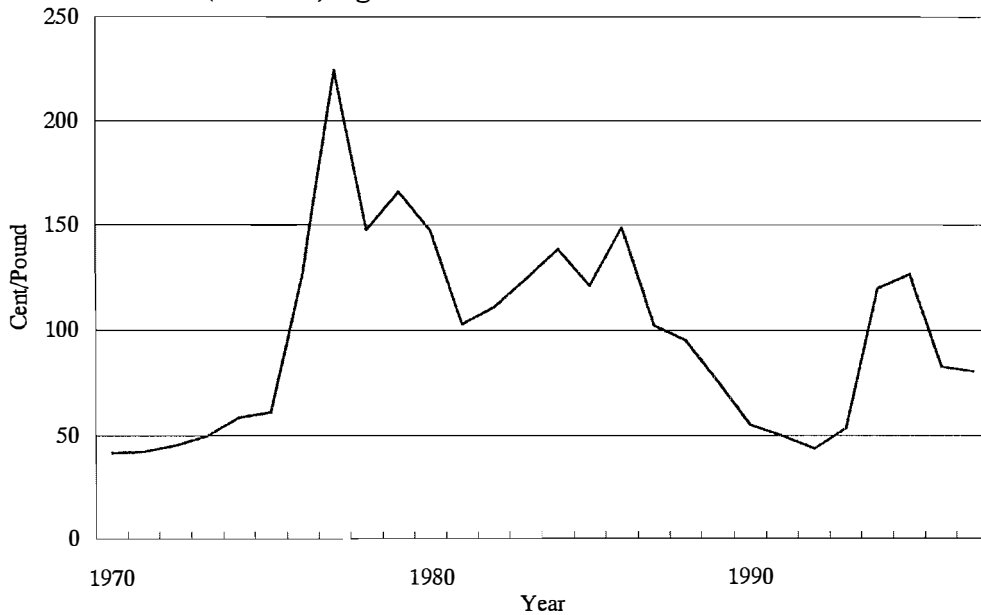
Figure 1.8
Growth Rate of Added Value in the Agricultural Sector in Rwanda (1967-97)



Source: World Bank [1999].

of the added-value in the agricultural sector between 1965 and 1993 was 3.55%: almost the same as the population growth rate. This implies that the production increase has depended totally on the enlargement of cultivated land.

Figure 1.9
Change in Coffee Price
(1968-97; Ugandan Coffee on the New York Market)



Source: IMF [1998: 170-171].

Such opinion, attributing Rwandan crises to the limit of food production, is so common among Rwandan intellectuals and foreign aid workers that it gives grounds for the radical policy reform, which we will mention later.

4. Reconstruction Program

The civil war that broke out in 1990 and the massacre in 1994 brought the catastrophe to Rwanda. How is the present government, which was established after the civil war, attempting to reconstruct the country? Various programs for economic and social reconstruction are now going on in Rwanda. We pick up here the investment programs (*Programme d'investissements publics*, hereafter PIP) of 1997 and 1998 in order to examine the prescription of the government (République Rwandaise, Ministère

des Finances et de la Planification Economique, Direction de la Planification Stratégique et Investissement [1997]; [1998]). In this section, the problem of fund raising and its allocation is particularly addressed, and the reconstruction program for the agricultural sector will be analyzed later.

PIP raised at first its three main goals for the medium term: (1) the recovery of production up to the level reached before the breakout of civil war, (2) stabilization of the macro-economy, and (3) formulation of the bases for long-term development and poverty alleviation. To attain these goals, the government presented six axes of policy: (1) economic liberalization, (2) fiscal restrictions, (3) prudent monetary control, (4) planning public investment on a sector basis, (5) strengthening national capacity, and (6) decentralization to promote the participation of the whole nation. Among these six axes, the first three can be understood in the context of structural adjustment policy. Although the structural adjustment policy once introduced in 1991 did not bring about a fruitful result, its principal idea survives up to today. In other words, as long as the investment plan depends on foreign funds, it is impossible to raise money today without the expression of such “neo-liberalism.”

As for the last three axes of policy, we examine them in Table 1.3, showing the PIP composition from 1997 to 1999. With this investment plan, the economic sectors are classified into four parts: the “productive” sector, “infrastructure” sector, “human resources and social development” sector, and “administration and finance” sector. The largest amount of funding was planned to be allocated for the “infrastructure” sector, comprising 37.6% of the total. In this sector, the greatest amount of funding was distributed for “urbanization and habitat,” “road infrastructure,” and “water.” The second largest amount of funding was to the “human resources and social development” sector; the funds were allocated in this sector with priority to “elementary and secondary education”, “public health”, and “repatriation and re-integration.” In the “administration and finance” sector, “local administration and communal development” and “planning, support and institutional reinforcement” were especially stressed. The funding for the “productive” sector was the smallest among these four sectors (18.25% of total); “agricultural development,” and particularly “food crop production,” was given priority.

The distribution of funds clarifies some characteristics of the investment program. As Table 1.3 shows, the greatest amount of funding was planned to be allocated for infrastructure investment. Significant amount of funding was also disbursed to take care of refugees in spheres such as “urbanization and habitat,” “water,” “public health,” and “repatriation and re-integration.” Moreover, the priority in agriculture was given to food crops. These observations lead us to conclude that the program had the ultimate goal

Table 1.3
Distribution of PIP by sector (1997-99)

(Million Rwandan Francs)

Sector	1997		1998		1999		Total	
	Amount	Proportion	Amount	Proportion	Amount	Proportion	Amount	Proportion
1. Productive Sector	16,560.29	15.28%	20,003.16	18.14%	23,927.74	21.19%	60,491.19	18.25%
(1) Agricultural Development Sector	14,247.13	13.15%	16,309.85	14.79%	18,595.87	16.47%	49,152.85	14.83%
•Food Crop Production	10,027.07	9.25%	10,928.04	9.91%	11,357.32	10.06%	32,312.44	9.75%
•Cash Crop Production	2,006.83	1.85%	877.43	0.80%	1,939.12	1.72%	4,823.38	1.45%
•Others	2,213.23	2.04%	4,504.38	4.08%	5,299.42	4.69%	12,017.03	3.62%
(2) Industrial, Mining, and Commercial Sector	2,313.16	2.14%	3,693.31	3.35%	5,331.87	4.72%	11,338.34	3.42%
2. Infrastructure Sector	38,635.62	35.66%	42,280.35	38.34%	43,605.03	38.62%	124,521.00	37.56%
(1) Public Works Sector	26,958.25	24.88%	28,697.25	26.02%	26,804.26	23.74%	82,459.76	24.87%
•Urbanisation and Habitat	11,964.98	11.04%	14,621.54	13.26%	14,724.41	13.04%	41,310.93	12.46%
•Road Infrastructure	11,519.68	10.63%	11,351.27	10.29%	5,142.47	4.55%	28,013.42	8.45%
•Others	3,473.59	3.21%	2,724.44	2.47%	6,937.38	6.14%	13,135.41	3.96%
(2) Water and Energy Sector	9,223.49	8.51%	10,369.39	9.40%	14,865.59	13.17%	34,458.47	10.39%
•Water	3,900.53	3.60%	6,105.10	5.54%	9,767.06	8.65%	19,772.69	5.96%
•Energy	5,322.96	4.91%	3,939.69	3.57%	5,098.53	4.52%	324.60	0.10%
•Others	0.00	0.00%	324.60	0.29%	0.00	0.00%	14,361.18	4.33%
(3) Communication Sector	2,453.88	2.26%	3,213.71	2.91%	1,935.18	1.71%	7,602.77	2.29%
3. Human Resources and Social Development Sector	35,498.30	32.76%	25,347.39	22.98%	22,908.80	20.29%	83,754.49	25.26%
(1) Education, Formation, Science and Culture Sector	16,640.31	15.36%	10,674.80	9.68%	10,985.63	9.73%	38,300.74	11.55%
•Elementary and Secondary Education	13,959.93	12.88%	8,739.84	7.92%	6,034.72	5.34%	28,734.49	8.67%
•Others	2,680.38	2.47%	1,934.96	1.75%	4,950.91	4.38%	9,566.25	2.89%
(2) Public Health and Population Sector	11,705.23	10.80%	10,332.46	9.37%	4,927.61	4.36%	26,965.30	8.13%
•Public Health	8,892.29	8.21%	7,745.33	7.02%	2,700.25	2.39%	19,337.87	5.83%
•Population	2,812.94	2.60%	2,587.13	2.35%	2,227.36	1.97%	7,627.43	2.30%
(3) Social Affairs Sector	7,152.76	6.60%	4,340.13	3.94%	6,995.56	6.20%	18,488.45	5.58%
•Repatriation and Re-integration	3,712.43	3.43%	2,400.09	2.18%	1,844.99	1.63%	7,957.51	2.40%
•Others	3,440.33	3.18%	1,940.04	1.76%	5,150.57	4.56%	10,530.94	3.18%
4. Administration and Finance Sector	17,649.40	16.29%	22,654.73	20.54%	22,471.50	19.90%	62,775.64	18.93%
(1) Administration Sector	7,735.31	7.14%	13,780.56	12.50%	17,115.98	15.16%	38,631.85	11.65%
•Local Administration and Communal Development	4,720.20	4.36%	9,495.59	8.61%	12,717.47	11.26%	26,933.26	8.12%
•Justice	2,233.20	2.06%	2,581.97	2.34%	3,662.51	3.24%	8,477.68	2.56%
•Defense and Security	781.91	0.72%	1,703.00	1.54%	736.00	0.65%	3,220.91	0.97%
(2) Planning and Finance Sector	9,914.09	9.15%	8,874.17	8.05%	5,355.52	4.74%	24,143.79	7.28%
•Planning, Support and Institutional Reinforcement	9,914.09	9.15%	8,874.17	8.05%	5,355.52	4.74%	24,143.79	7.28%
Totaal	108,343.61	100.00%	110,285.63	100.00%	112,913.07	100.00%	331,542.32	100.00%

Source: République Rwandaise, Ministère des Finances et de la Planification Economique [1997: Annexe 2].

to satisfy the basic needs rather than to realize high economic growth.

Table 1.4
Main Contributors to PIP

(Million Rwandan Francs/%)

Contributor	Total Amount	%	Donation	%	Loan	%
EU	47,281.13	14.87	41,913.82	16.80	5,367.31	7.84
IDA	37,778.14	11.88	0.00	0.00	37,778.14	55.19
BAD/FAD	18,989.78	5.97	901.16	0.36	18,088.62	26.42
Germany	18,185.51	5.72	18,185.51	5.72	0.00	0.00
Belgium	9,224.67	2.90	9,224.67	3.70	0.00	0.00
Switzerland	6,487.33	2.04	6,487.33	26.60	0.00	0.00
IFAD	4,503.81	1.42	1,123.14	0.45	3,380.67	4.94
Netherlands	4,526.11	1.42	4,526.11	1.81	0.00	0.00
France	4,481.78	1.41	4,111.29	1.65	370.00	0.54
UNDP	4,000.19	1.26	4,000.19	1.60	0.00	0.00
UNICEF	3,654.59	1.15	3,654.59	1.46	0.00	0.00
Canada	3,368.02	1.06	3,368.02	1.35	0.00	0.00
Total	162,481.06	51.10	97,495.83	39.77	64,984.74	94.93

Source: République Rwandaise, Ministère des Finances et de la Planification Economique, Direction de la Planification Stratégique et Investissement [1997: 54]

Table 1.5
External Funds by Status and by Sector

(%)

Status of Fund	Total	Productive	Infrastructure	Human Resources	Administration /Finance
Already acquired	52.86	65.77	49.83	58.57	39.31
Under negotiation	3.22	12.02	1.56	0.00	2.30
To be sought	43.92	22.21	48.61	41.43	58.39
Total	100.00	100.00	100.00	100.00	100.00

Source: République Rwandaise, Ministère des Finances et de la Planification Economique, Direction de la Planification Stratégique et Investissement [1997: 52].

Another PIP characteristic was that of fund raising. At first, it depended almost totally on external sources. Foreign funding for PIP during 1997 – 99 comprised 95.90% of the total. This deep dependence on external funding is a Rwandan structural problem rather than an exceptional situation after the civil war: even for PIP during 1991 – 93, whose level of external funding was the lowest in the 1990s, it made up 86.72% of the total. The major PIP donors are indicated in Table 1.4. The potential for fund raising was, moreover, not clearly defined for the major part of the program. As shown in Table 1.5, the proportion of funds already assured by the donors was only around 40% of the total.

Although the proportion was ameliorated in PIP 98/2000, it resulted in a reduction of the total amount of funding (République Rwandaise, Ministère des Finances et de la Planification Economique, Direction de la Planification Stratégique et Investissement [1998:39]).

As we have already examined, the idea of PIP lies in providing for the basic needs of the nation rather than the achievement of high economic growth. Such a strategy is understandable for a country that has been devastated by civil war. However, the problem is whether this strategy is compatible with the above-mentioned medium-range goals; put simply, we must ask whether Rwanda will be able to borrow the funds from foreign countries and pay them back. The allocation of funds to the “productive” sector was not only the smallest among the four economic sectors, but its largest part for “food crop production.” While it is certain that the PIP objective was to complement the present lack of the economy, we cannot identify a clear strategy for long-term economic development in this program.

5. Agricultural Structure

We analyze in this section the structure of Rwandan agriculture from recent statistics. Table 1.6 shows the principal agricultural production by each household. This table indicates some characteristics of agricultural production in Rwanda. The first is that the production of food crops has overwhelming importance in agricultural management. Although coffee is the most important export crop produced by the peasants, its priority in the agricultural management of each household is not great. Tea, another important export crop, is mainly produced on large-scale plantations.

Secondly, banana makes up the largest share in food crops. In many cases, these bananas are used to brew beer. Banana beer has important significance in Rwandan society: people often use it in ceremonies and for exchange. Thirdly, there are many food crops used for the staple diet besides banana: haricot, sorghum, and root crops such as sweet potato, Irish potato and cassava are the other main staples. Different from some Central African regions depending heavily on cassava, and East and Southern African regions depending on maize, Rwanda has various staple diets composed of banana, root crops, cereal crops and beans. Table 1.7 indicates this point from calories provided, showing that the four main food crops providing calories are banana, haricot, sorghum and sweet potato. This table also shows that the principal food crops are different from region to region. In general, the southern, western and northwestern parts of the territory

Table 1.6
Agricultural Production of Each Prefecture by Household

	(Kilograms)										
	Butare	Byumba	Changugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri	Total
Banana for cooking	146.3	504.9	410.3	29.7	133.1	261.1	2545.8	62.6	773.0	219.9	474.9
Banana for beer	1260.6	1574.3	1070.9	491.4	1001.2	1987.8	3440.9	444.5	2375.1	943.1	1505.9
Banana for dessert	133.0	342.6	156.7	27.9	72.8	271.1	488.8	43.3	301.3	118.1	202.4
Total Banana	1539.9	2421.8	1637.8	549.0	1207.2	2520.0	6475.5	550.4	3449.3	1281.0	2183.2
Haricot	93.8	265.5	73.9	28.7	72.2	128.6	267.9	74.8	330.7	181.2	160.9
Green Pea	5.6	11.0	6.3	11.4	6.9	6.0	6.8	21.1	5.1	10.7	8.6
Sorghum	90.5	305.6	12.3	45.2	11.5	62.8	207.7	38.5	165.3	113.6	111.4
Maize	13.6	58.3	57.2	30.3	247.2	18.5	37.4	201.7	25.0	120.8	75.2
Paddy	27.4	0.7	0.2	0.0	1.7	0.0	11.7	0.0	2.1	0.2	4.8
Cassava	279.6	130.0	259.3	52.5	47.8	402.9	236.4	88.2	395.8	42.3	208.5
Irish Potato	30.7	72.5	33.7	76.0	545.4	29.9	38.5	127.9	35.1	1165.3	223.0
Sweet Potato	782.8	644.6	393.9	780.4	534.6	759.6	463.2	627.6	493.0	815.9	642.9
Taro	68.5	17.4	193.8	62.0	26.7	69.0	38.1	61.8	58.5	58.1	61.9
Coffee	20.2	16.3	63.4	14.4	68.4	45.2	49.4	1.8	42.6	3.2	32.2

Source: République Rwandaise, Ministère de l'Agriculture et de l'Elevage [1992: 15].

Table 1.7
Percentage of Calories Provided by Each Agricultural Product

	Butare	Byumba	Changugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri	Average
Banana	17.7	23.2	30.3	8.3	14.3	26.1	53.2	7.5	31.8	12.3	25.5
Haricot	11.6	20.9	10.9	5.4	9.2	13.7	14.5	10.6	25.6	16.0	15.9
Green Pea	0.7	0.9	1.0	2.2	0.9	0.7	0.4	3.1	0.4	1.0	0.9
Sorghum	11.2	24.2	1.8	8.4	1.5	6.7	11.3	5.4	12.8	10.0	11.0
Maize	1.8	4.9	9.0	6.0	33.3	2.1	2.2	30.3	2.1	11.3	7.9
Paddy	2.3	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.1	0.0	0.3
Cassava	11.7	3.5	12.9	3.3	2.0	14.5	4.3	4.2	10.4	1.3	6.9
Irish Potato	0.7	1.1	0.9	2.7	13.1	0.6	0.4	3.4	0.5	19.5	4.2
Sweet Potato	34.5	18.1	20.8	51.9	24.2	28.8	9.0	31.6	13.6	25.6	22.6
Taro	2.2	0.4	7.5	3.0	0.9	1.9	0.5	2.3	1.2	1.3	1.6

Source: République Rwandaise, Ministère de l'Agriculture et de l'Elevage [1992: 23].

Table 1.8
Land Use in Each Prefecture by Household

	Butare	Byumba	Changugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri	Average
Banana	14.51	19.65	10.13	8.51	9.40	21.50	38.33	5.74	17.34	12.45	16.06
Beans	12.20	21.79	9.05	16.99	9.27	12.84	32.95	17.52	19.13	17.84	16.71
Cereals	2.43	8.26	5.38	4.67	10.27	2.03	6.38	17.10	5.62	16.06	7.44
Root Crops	15.55	12.42	16.00	14.62	9.60	20.56	14.08	21.50	12.92	13.40	14.95
Industrial Crops	5.40	2.37	9.26	4.10	4.69	5.75	5.88	2.89	6.42	0.92	4.71
Vegetables & Fruits	0.92	3.66	0.86	2.18	0.72	2.69	2.37	1.80	3.47	2.85	2.25
Cultivated Area	51.01	68.13	50.69	51.06	43.95	65.38	99.99	66.55	64.90	63.52	62.11
Fallow & Pasturage	22.40	33.47	8.43	26.51	5.07	24.38	39.33	50.56	23.27	11.55	23.70
Cultivable Area	73.41	101.60	59.12	77.57	49.02	89.76	139.32	117.12	88.16	75.07	85.81
Woodland	7.63	9.19	6.03	21.52	4.57	9.12	4.07	47.93	3.37	16.60	11.66
Non-Cultivable & Housing	2.73	3.22	2.30	3.74	2.36	3.28	5.57	2.62	2.63	3.87	3.19
Total Area	83.77	114.01	67.46	102.84	55.95	102.16	148.97	167.67	94.17	95.54	100.66

Source: République Rwandaise, Ministère de l'Agriculture et de l'Elevage [1992: 46].

depend more on root crops, while the eastern region depends rather on banana.

Let us next examine the land use in rural Rwanda. Table 1.8 indicates the land use in season A (from October to January) of the 1990 agricultural year. This table indicates that the land held by Rwandan peasants is generally very small: the average land holding per household is about 1 ha, of which only 0.6 ha is cultivated. Almost all of the cultivation is food crops. Although the peasants generally have a small amount of land, differentiation among them exists: while the average area of land held by the upper 25% of peasants is 1.95 ha, the lower 25% have only 0.34ha (République Rwandaise, Ministère de l'Agriculture et de l'Élevage, [1992: 53]). Landless farmers are, however, not many: almost all households have some land, even if a trivial amount. There is also some difference of land holding among the regions: as Table 1.8 shows, in prefectures with a high population density situated on the central plateau or along the shore of Lake Kivu such as Butare, Gisenyi and Changugu, the peasants hold much less land than in the other prefectures. On the contrary, the peasants in the eastern region such as Kibungo hold a relatively large area of land.

Due to its small area, the peasants use the land very intensively in Rwanda. In many cases, they cannot afford to fallow their fields. Not having enough land for fallowing or grazing means that they often plant food crops every year in the same fields. The risk of soil degradation and land erosion must therefore be high. The peasants do make efforts to manage this situation. Planting beans is, for example, useful to prevent soil degradation. They also put organic fertilizer such as burned household garbage and manure onto their fields. Agriculture in the Great Lakes region has a long history of crop rotation, in which cattle raising was efficiently utilized (De Sclippé [1957]). This experience may have given Rwandan peasants the capability to confront the land shortage. Nevertheless, the present situation is so serious that we cannot help worrying about land degradation. Although land rotation in the traditional context was the result of peasants' wisdom to ameliorate productivity, today's land use seems to be mere intensification forced by the rapid population growth.

This point is also related to cattle raising that used to have significant social meaning in Rwandan society. Table 1.9 shows the number of domestic animals in Rwanda. The number of cattle was estimated in the census in 1990 as 800 thousand: i.e. around two head per household. The possession of cattle was concentrated on members of the dominant class during the colonial period, but after the social change at independence, the number of important cattle owners has been drastically reduced. It has often been said about Rwandan society that the Tutsi are herders and the Hutu are farmers. However, such a distinction is no longer clear. While it is true that some Tutsi such as

Table 1.9
Estimated Numbers of Domestic Animals in Rwanda

		Head	%
Cattle	Total	813,417	100.0
	cows	302,708	37.2
	heifers	206,995	25.4
	oxen	3,490	0.4
	bulls	41,501	5.1
	bullocks	92,590	11.4
	calfs	166,133	20.4
Ovine	Total	733,000	100.0
	rams	51,345	7.0
	ewes	453,131	61.8
	lambs	228,524	31.2
Goat	Total	1,891,612	100.0
	billy-goats	108,686	5.7
	she-goats	1,174,614	62.1
	kid-goats	608,312	32.2
Pig	Total	244,980	100.0
	pigs	51,175	20.9
	she-pigs	87,629	35.8
	kid-pigs	106,176	43.3

Source: République Rwandaise, Ministère de l'Agriculture et de l'Élevage [1992: 72].

chiefs possessed a lot of cattle during the colonial period, they lost their cattle and, moreover, their land in the turmoil after the end of the colonial period. In addition, the number of cattle in Rwanda has stagnated because of the land shortage for pasturage. Most of the Rwandan peasants, be they either Tutsi or Hutu, have only small number of cattle with small parcel of land. In the regions where individual landholding is very small, it is difficult to find land for grazing, thus resulting in the stagnation of cattle raising. As this leads to a reduction in manure production, this would constitute a vicious circle for land conservation.