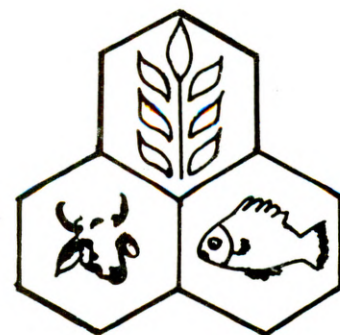


#10

MINISTRY OF AGRICULTURE,  
ANIMAL HUSBANDRY AND FISHERIES



# SURINAME DAIRY PRODUCTION PROJECT FEASIBILITY STUDY

INTERAMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE

OFFICE IN SURINAME

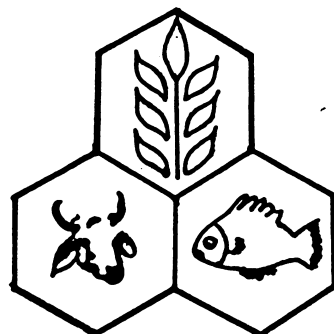


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MINISTRY OF AGRICULTURE,  
ANIMAL HUSBANDRY AND FISHERIES



SURINAME DAIRY PRODUCTION PROJECT  
FEASIBILITY STUDY

I

INTERAMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE

OFFICE IN SURINAME



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The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialized agency for agriculture of the Inter-American system. The Institute was founded on October 7, 1942 when the Council of Directors of the Pan American Union approved the creation of the Inter-American Institute for Agricultural Sciences.

IICA was founded as an institution for agricultural research and graduate training in tropical agriculture. In response to changing needs in the hemisphere, the Institute gradually evolved into an agency for technical cooperation and institutional strengthening in the field of agriculture. These changes were officially recognized through the ratification of a new Convention on December 8, 1980. The Institute's purposes under the new Convention are to encourage, promote and support cooperation among the 29 Member States, to bring about agricultural development and rural well-being.

With its broader and more flexible mandate and a new structure to facilitate direct participation by the Member States in activities of the Inter-American Board of Agriculture and the Executive Committee, the Institute now has a geographic reach that allows it to respond to needs for technical cooperation in all of its Member States.

The contributions provided by the Member States and the ties IICA maintains with its twelve observer countries and numerous international organizations provide the Institute with channels to direct its human and financial resources in support of agricultural development throughout the Americas.

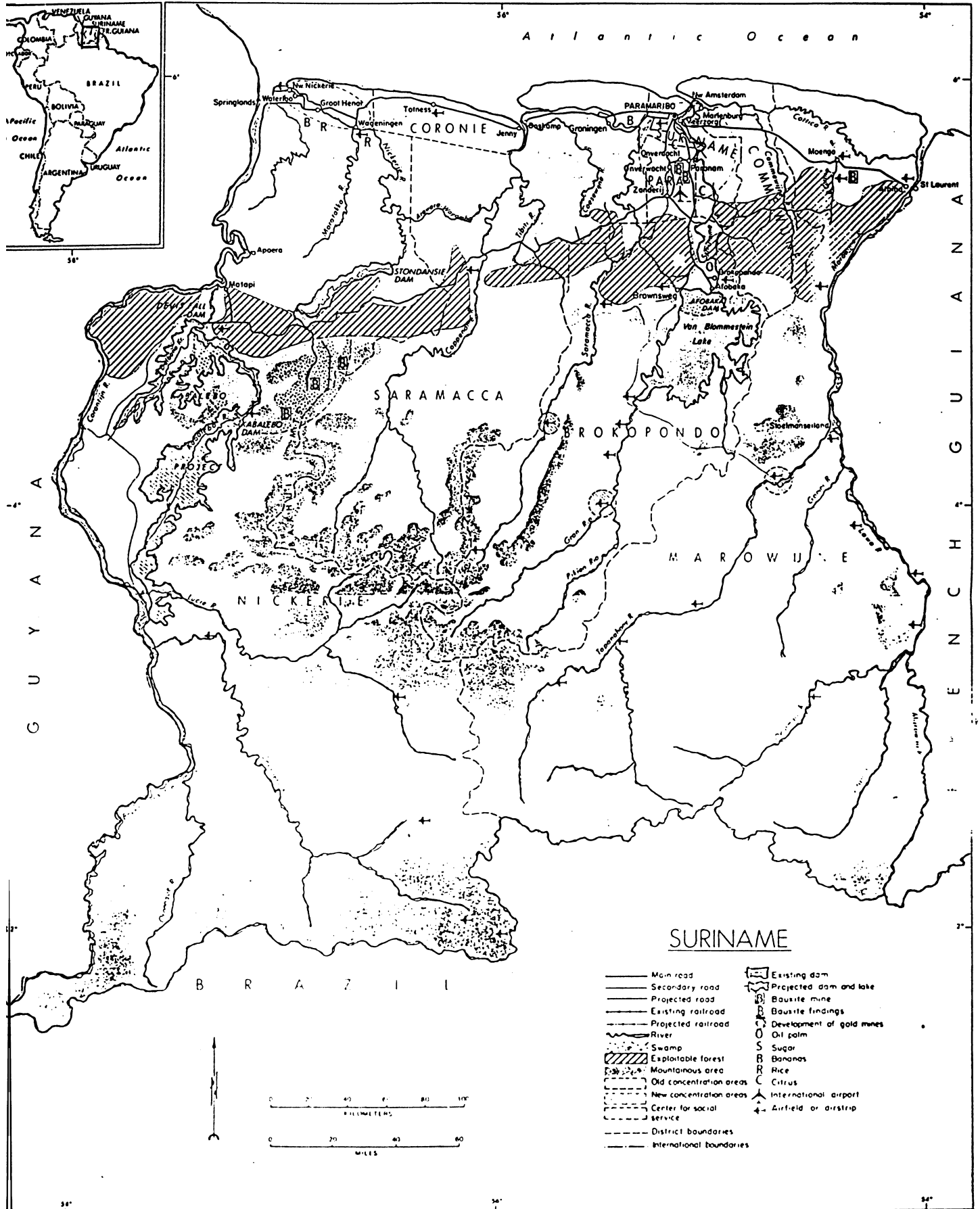
The 1987-1991 Medium Term Plan, the policy document that sets IICA's priorities, stresses the reactivation of the agricultural sector as the key to economic growth. In support of this policy, the Institute is placing special emphasis on the support and promotion of actions to modernize agricultural technology and strengthen the processes of regional and subregional integration.

In order to attain these goals, the Institute is concentrating its actions on the following five programs: Agrarian Policy Analysis and Planning; Technology Generation and Transfer; Organization and Management for Rural Development; Marketing and Agroindustry; and Animal Health and Plant Protection.

These fields of action reflect the needs and priorities established by the Member States and delimit the areas in which IICA concentrates its efforts and technical capacity. They are the focus of IICA's human and financial resource allocations and shape its relationship with other international organizations.



MAP I



SURINAME DAIRY PRODUCTION PROJECT





# SURINAME DAIRY PRODUCTION PROJECT

## FEASIBILITY STUDY

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EXECUTIVE SUMMARY  
SURINAME DAIRY PRODUCTION PROJECT

I. BACKGROUND

While Suriname has inherited from Holland a sound basic tradition in dairying and possesses a good national herd of dairy animals based on the original Holstein-Friesian importations crossed with Zebu, Sahiwal and other breeds, over the last two decades milk production has decreased substantially and the country has depended more and more on imported milk.

In recent years, as a result of the extreme shortage of foreign exchange, the vulnerability of the population to such nutritional distortions has become painfully obvious. The Government of Suriname is therefore committed to achieve the very highest level of self-sufficiency in terms of milk and dairy products, thereby substantially reducing the drain of foreign exchange from the country and simultaneously reducing the nutritional vulnerability of the population.

Survey results have revealed that the bulk of the milk production is in the hands of the small farmers (25ha or less) on farms in the three districts immediately surrounding the capital city of Paramaribo: Wanica, Para and Saramacca.



## II. OBJECTIVES

The objectives of this project are:

### 1. Increased Total Production of Fresh Cow Milk

Substantial increases in the production of fresh cows milk to replace imports and save foreign exchange.

### 2. Efficient and Effective Marketing System for the Domestic Milk Output.

Comprehensive improvement in the physical and service infrastructure for the collection and processing of milk.

## III. OUTPUTS

This project has been designed to achieve the following outputs:

### 1. Technology Transfer

#### a. Extension

An efficient and effective dairy production extension service guiding dairy farmers for the continuous improvement of dairy production systems.

#### b. Demonstration Farms

Actual farms in the project area established as models for each size category and serving both for demonstration of improved technologies and for testing the technical targets erected for the project.





c. Training

Extensionists, and farmers in significant number trained in all aspects of Modern Dairy Technology and a training manual produced by the Project Administration for general use in Suriname.

d. Research

An applied research program focussing on problems of nutrition of the dairy herd for milk and beef production.

2. Marketing

An efficient collection and delivery system serving effectively all dairy farmers in the Project Area.

3. Production Support Services.

a. Adequate and Appropriate Credit readily available to farmers for viable dairy farm investments.

b. An Adequate Supply of Essential Production Inputs regularly available at reasonable cost.

4. Technical Cooperation.

The capabilities of the staff, and the efficiency and the effectiveness of the operations of the Ministry of Agriculture, the Agricultural Bank, the Dairy Farmers Union and the Milk Plant, in support of the development of the dairy industry, will be significantly improved.



IV. PROJECT AREA AND BENEFICIARIES

The project area is the main dairy farming area in the country. Situated in the Middle region, it is the area South, South-West and West of Paramaribo within a radius of not more than 50 km from the city center, and is located in five administrative districts: Wanica A, B, and C, Para and Saramacca.

There are over 2700 dairy farms in this area, most of them occupying less than 10 hectares of land and producing very low yields of milk per cow and per hectare. This concentration of dairying is a ideal focus for a national dairy development project. The basic resources - albeit undeveloped - are present and a very ready market is at hand.

The direct beneficiaries will be the 800 - 1000 farmers who will be the primary participants. Ultimately, granted that the project is reasonably successful all dairy farmers in the area benefit.

The project is designed to realize its objectives through improvements in productivity and production on 800 dairy farms ranging in size from 1.0 - 25.0 ha in the project area. These farms will be selected by the Project Administration in collaboration with the Ministry of Agriculture, the Dairy Farmers Union and the Agricultural Bank.

The project will focus on three model dairy farms which control land areas averaging.

- 1.5 ha - 168 farms
- 4.5 ha - 500 farms
- 12.5 ha - 132 farms

These sizes are in fact the modal sizes in the 1984 survey of dairy farms in the 0 - 3 ha, and 10 - 25 ha groups respectively.



V. PROJECT COMPONENTS

The implementation of this project is planned around the following essential components.

The Transfer of Improved and Appropriate Dairy Farming Technology.

Using a combination of specialised extension demonstration and - to a limited extent - applied research.

Provision of Adequate Readily Accessible and Timely Credit.

To finance on-farm capital investment by dairy farmers.

Strengthening and Expanding the Raw Milk and Processing System of the Melkcentrale N.V.

Supply of Essential Inputs at reasonable cost.



## VI. PROJECT IMPLEMENTATION

### 1. The Borrower

On completion of successful loan negotiation, the official borrower will be the Government of the Republic of Suriname, which will in turn create an independent body, a Project Authority (or Stichting or Foundation) to execute the project, reporting to the Minister of Agriculture.

### 2. The Executing Agency

The executing agency will be the Suriname Dairy Authority (or Foundation) comprised of a Board of Directors and a project Implementation Unit.

The Board of Directors would be the following.

1. A Chairman, appointed by Government (possibly from the Private Sector).
2. Director of the Ministry of Agriculture.
3. Sub-director, Ministry of Agriculture, Livestock Division
4. Sub-director, Ministry of Agriculture, Extension Division
5. Manager, Milk Centrale N.V.
6. Chairman, Dairy Farmers Union
7. Economic Analyst, Agricultural Bank, and
8. The Project Manager, who will serve as the non-voting Executive Secretary of the Board.





(vii).

The Project Implementation Unit would consist of the following contracted personnel:

Project Manager.

Three (3) Dairy Production Co-ordinators

Ten (10) Dairy Production Assistants.

One (1) Administrative Officer

One (1) Project Accountant

Two (2) Secretary Typists

One (1) Driver/Messenger

#### VII. PROJECT COSTS AND REQUIRED EXTERNAL FINANCING

Total Project costs for the 15 years of project life is US\$91,7 million most of which - some US\$83,7 million is spent by 800 farmers on incremental operating costs and investments over the period.

The required financing to organize and put the project in place is US\$13,9 million - most of which, some US\$9,2 million - provides the Line of Credit to the farmers for necessary on-farm investments. Table, on the next page, gives the details of the external financing required.

#### VIII ECONOMIC BENEFITS

The economic benefits are summarized in Table 2 which shows the increase in milk and animal production from the project area that should be realised over 15 years.



SURINAME DAIRY PRODUCTION PROJECT  
FINANCIAL REQUIREMENTS YRS 1 - 5

(US\$000)

Table 1

	YEARS	1	2	3	4	5	TOTAL
EXTERNAL FINANCE							
1. Project Implementation Project Unit	1 - 5	1095.8	549.4	344.4	371.4	376.4	2737.4
2. Grass Nursery	1 - 5	102.7	42.7	28.1	28.1	28.1	229.7
3. Demonstration Farms	1 - 5	7.3	8.2	9.0	10.9	11.5	46.9
4. Technical Manual	2		10.0				10.0
5. Applied Research	1 - 3	19.0	10.0	10.0			39.0
6. Vehicles for Agricultural Bank	1 - 2	14.0	14.0				28.0
7. Lines of Credit:							
(i) Farmers	1 - 6	270.7	1382.3	2144.2	2348.6	3022.6	9168.4
(ii) Milk Collectors	1 - 3	315.3	215.3	43.7			574.3
(iii) Milk Plant Rehabilitation	1 - 2	1038.1					1038.1
TOTAL		2862.9	2231.9	2579.4	2759.0	3438.6	13871.8

\* Includes US\$ 979,200 for year 6.



## Value of Increased Livestock Production from Project Area

(US\$000)

Table 2

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
YRI	200.00	279.00	367.00	377.00	474.00	729.00	967.00	1213.00	1345.00	1395.00	1372.00	1365.00	1316.00	1453.00
MODEL A FARMS	1029.00	1429.00	2512.00	3275.00	3147.00	3809.00	4219.00	3900.00	4167.00	4426.00	4278.00	4344.00	4295.00	4344.00
MODEL B FARMS	306.00	479.00	622.00	855.00	1035.00	1442.00	1931.00	2019.00	2752.00	3011.00	3078.00	3118.00	3118.00	3118.00
MODEL C FARMS	1535.00	2187.00	3501.00	4507.00	4656.00	5980.00	7117.00	7132.00	8264.00	8832.00	8728.00	8827.00	8729.00	8915.00
SUB-TOTAL	659.00	1525.00	2947.00	5713.00	7975.00	9993.00	11699.00	12026.00	12701.00	13200.00	13200.00	13200.00	13200.00	13200.00
* Value of Additional Milk from Project Area	2194.00	3712.00	6448.00	10220.00	12631.00	15973.00	18816.00	19158.00	20965.00	22032.00	21928.00	22027.00	21929.00	22115.00
TOTAL	2853.00	5237.00	9395.00	15933.00	20606.00	25966.00	30515.00	31184.00	35666.00	35232.00	35128.00	35227.00	35129.00	35315.00



IX. TECHNICAL FEASIBILITY

The Suriname Dairy Production Project is designed to maximize the excellent natural resources which the country possesses for such enterprise. In addition to good soils and well distributed and ample rainfall, the country has a good national herd of dairy animals and a sound basic tradition in dairy technology and in the mid-sixties was already producing over ten million litres of milk in the Middle Region alone.

The extreme range which can be found in production per cow and per hectare, and which can be traced to variations in management and simple technologies is a certain indication of the immense potential for increased production and productivity in the sector.

The technology is available and can be carried effectively to the small farmers by this Project, which will also ensure the availability of essential inputs and an adequate marketing structure to deal with increased production.

X. ECONOMIC FEASIBILITY

As may be seen from the Summary Project Cash Flow following (Table 3) the returns to this project are extremely attractive.

The project enjoys an Internal Rate of Return of 48%.





SURINAME DAIRY PRODUCTION PROJECT  
PROJECT CASH FLOW YEARS 1 - 15  
(US\$000)

Table 3

	YR1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
<b>BENEFITS</b>																
Value of Additional Milk and Animal Production From Project Area	945.0	2194.0	3712.0	6448.0	10220.0	12631.0	15973.0	18816.0	19158.0	20965.0	22032.0	21928.0	22027.0	21929.0	22115.0	221093.0
<b>COSTS</b>																
On-farm Incremental Costs and Investments	1024.0	3087.0	4922.0	6261.0	7083.0	6762.0	6139.0	6141.0	6146.0	6244.0	6076.0	6006.0	5968.0	5909.0	5898.0	83666.0
Project Implementation and Support Services	2408.0	811.2	645.6	687.5	693.9	455.4	340.8	324.4	302.0	295.8	275.9	230.7	212.4	196.9	185.0	8065.5
Total Project Costs	3432.0	3898.2	5567.6	6948.5	7776.9	7217.4	6479.8	6465.4	6448.0	6539.8	6351.9	6236.7	6180.4	6105.9	6083.0	91731.5
Net Cash Flow	-2487.0	-1704.2	-1855.6	-500.5	2443.1	5413.6	9493.2	12350.6	12710.0	14425.2	15680.1	15691.3	15846.6	15823.1	16032.0	129361.5



## I BACKGROUND

### 1.1. GEOGRAPHICAL FEATURES OF SURINAME

#### 1.1.1 GENERAL

Suriname is one of the three Guyanas which developed out of the colonization by the British, French and Dutch of the North-eastern Coastline of South America. In fact it is bounded by Guyana (English Speaking) on the West, French Guyana on the East and Brazil on the South. Its area of 164 thousand square kilometers lies between 2<sup>0</sup> and 6<sup>0</sup> North latitude and 54<sup>0</sup> and 58<sup>0</sup> West longitude.

#### 1.1.2 CLIMATE

The climate may be generally described as a wet tropical climate. Total annual rainfall varies between 1250 mm and 3250 mm per annum distributed over two rainy seasons interspersed by two dry seasons usually in the following sequence:

Short Dry Season : February to April

Main Wet Season : May to Mid-August

Main Dry Season : Mid-August to November

Short Wet Season : December to January

However there is a wide variation in the starting and ending dates of the seasons and in some years the shorter seasons may be undefined in time.

The mean annual temperature is 27<sup>0</sup>C with a range of 23<sup>0</sup>C to 31<sup>0</sup>C while the relative humidity in the developed coastal area remains at 81% year round.

Daily sunshine hours vary from around 37% in the wet season to 63% in the dry season with an annual average of 58%.



The North East Trade winds prevail, blowing from East to West, but with relatively low force - averaging from 5 meters per second in the long wet season to 8 meters per second in the short dry season.

### 1.1.3 SOILS and TOPOGRAPHY

From the Atlantic coast towards the Southern border the following physiographic regions can be distinguished:

- the Demerara formation or Young Coastal Plain;
- the Coropina formation or Old Coastal Plain;
- the Older formation.

The Demerara formation is of Holocene age, with a maximum width of  $\pm$  150 km in the western part of the country.

The landscape has a relative flat topography while the material has been deposited by fluvio-marine activities (van Amson, 1975). The area is dominated by the occurrence of very heavy clay soils, locally alternating with sand or shell bar complexes.

The clay that originates from the Amazon estuary has a high chemical status but low lime content. It shrinks and swells tremendously.

Depending on activities by human beings, vegetation, topography and climate, different soils will develop, or acid clay soils characterized by ironized root tubes and a high drainage potential will occur (van Amson, 1966).

Occasionally very acid sulfate soils (cat clays) will develop. The sand or shell bars are sedimented as complexes, consisting of individual elongated ridges.

From the ridge crest towards the ridge foot the morphological, physical properties change. Particularly the genesis of the sandy ridges is strongly dominated by the groundwater. In general, the fertility of these soils is moderate to poor (van Amson, 1961).

•

The Coropina formation or Old Coastal Plain is of Pleistocene age. The landscape is gently rolling and consists of poor sandy soils which can be strongly podzolized.

More to the south the silty soils become more pronounced. Between these sandy and silty sediments, chemically poor clay soils occur. This belt covers roughly 4,300 square kilometers.

The generally excessively drained soils of the Coesewijne (Zanderij) formation have a north south dimension that ranges from 60 to 70 km in the western part of the country, to only 5 to 10 km in the east. The topography is level to very gently rolling.

Typical is the occurrence of coarse, strongly podzolized, white sand. The other soils have a yellow or yellowishbrown color and consist of a coarse sandy clay texture. All the soils in this area are chemically very poor (van Amson, 1975), while the white sands often occur within yellow sand areas.

The larger part of the country consists of deep, weathered products in situ and are of Pre-Cambrian age. The topography is hilly, with generally well-drained, reddish brown and yellow coarse sandy loam soils.

Typical is the occurrence of iron concretions at different depths in the profile. The valleys between the hills have variable soils. In general the soils of this southern formation have a low chemical status (van Amson, 1975).

#### 1.1.4 WATER RESOURCES AND DRAINAGE

Suriname is abundantly supplied with surface water resources which are fed by the forested catchment areas in the South into the four large rivers which flow from South to North and into three large swamp areas, one in the South-West and North-West which serve as water conservancies for rice cultivation.





But this abundance of water is countered by two problem conditions which result from the very flat nature of the coastal topography and the predominance of heavy clay soils. One problem is the intrusion of salt water into the main rivers and coastal flood plains. This advance of the saltfront which varies from 30 km upriver in the wet season, severely limits the use of the water for irrigation. The second is the need for a very costly drainage infrastructure - costly to construct and costly to maintain - in many of the coastal and riverain agricultural areas.

#### 1.1.5 NATURAL VEGETATION

Most of the country covered by high dryland tropical forest, which together with small areas of mountain forest and xerophytic forest cover 85% of the interior landscape.

In the coastal and sub-coastal areas there is the usual mangrove and saltfern vegetation of the tidal swamps and flats, succeeded by fresh water swamps and marsh vegetation and low and "high" swamp forest which altogether occupy an estimated 8% of the land in Suriname.

Tree and shrub savannah type vegetation tends to occur in small scattered areas covering only about 1% of the country.

The rest is, of course, agricultural areas, forest plantations, abandoned agricultural land, mining areas, roads and built-up areas. Only about 3% of Suriname's land resources has been opened up.



## 1.2 Socio - Economic Overview

Suriname, in common with every other country of the Western Hemisphere, began its modern socio - economic life as the colonial territory of an European state. Therefore, like most former colonies, its colonial past, its settlement and development, and its ties in language, cultural traditions and institutions to the metropolis, has largely shaped its present.

These linkages have not been always beneficial. When the country became independent in 1975 after 25 years of internal self-government within the Dutch Commonwealth, over 20% of native born Surinamise opted for Dutch citizenship and emigrated to Holland. The remaining population - between 380 and 400 thousand - is a youthful one with 70% being under the age of thirty. This population is also highly literate and generally possesses an urban sophistication, residing mainly in and around the capital city of Paramaribo (80%) and along the developed coastal strip (10%). The Suriname society is noteworthy for an ethnic diversity unmatched anywhere else in the Caribbean, resulting from the import of slaves and indentured labour for the colonial plantations. The current racial distribution is:

East Indian	35%
African (Creole)	40%
Javanese	15%
Other (Chinese, Europeans, Syrian, Lebanese, Amerindian)	10%

The per capita income and standard of living of the Surinamese is relatively high as compared with other hemispheric countries.

The country possesses a wealth of resources, not only expendable resources such as bauxite and some gold and diamonds, but important renewable resources such as its coastal and estuarine fisheries, fertile soils, ample water supplies and extensive forests.



## II THE NATIONAL ECONOMY

### 2.1 Aggregate Production and Demand

The evolution of the Surinamese economy since its independence from the Netherlands in 1975 can be clearly divided into two periods. One period extending from 1975 to 1978, was of real growth as measured by G.D.P. at constant prices. The second stage was a period of constant decline in output lasting from 1979 to 1986 (see Annex II.1.1). The average annual growth rate during the first four years was 8.25% while the annual rate of decline ever since has been -1.41 percent. Growth in those first years of independence can be attributed mainly to high public sector investment and to the good performance of bauxite in the international markets. The decline of public investment and the uncertainty to private investors brought about by the revolution of 1980 were the main causes for the negative performance of the Surinamese economy in recent years. This growth, along with a zero population growth, brought about an increase in the per capita income as measured by either GDP, GNP or National Income (see Annex II.1.2)

The level of private investments was mainly determined by the bauxite sector, following the expectations of the alumina world market. But public investments also grew rapidly with the implementation of the Multi-Year Development program which was financed mainly through the Dutch development aid and revenues from the bauxite sector.

Since Suriname never generated sufficient national savings to finance all of its domestic investments, it has relied much on foreign savings to finance about 25 percent of its development.

Domestic expenditures for the period 1975-1980 were higher than GDP at market prices, widening the resource gap up to 6.6 percent of the GDP in 1977. This situation was not particularly worrying as long as the Dutch development aid provided out of the agreement on development cooperation with the Netherlands at independence, was flowing.



Indeed, the Dutch development aid averaged 9 percent of GDP from 1976 to 1982. This inflow on the capital account, together with the earnings from the bauxite and its derivatives on the current account, generated annual overall surpluses on the balance of payments in the 1970's. As of this result Suriname maintained a comfortable cushion of foreign exchange reserves, equivalent to some four months of imports during 1975-1982. The economy started to decline in 1980 when the world market for bauxite ore and related products started to weaken. The bauxite sector which accounts for about 75% of the country's export earnings (see Table II.b), suffered a reduction of more than 40 percent from 1980 to 1986.

TABLE II.b                      CONTRIBUTION OF THE BAUXITE SECTOR AS A PERCENTAGE  
OF THE TOTAL VALUE OF EXPORTS  
(in millions of Surinam gldrs)

<u>Total Merchandise</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Export value	911	45	770	647	659	583	588
of which							
- Bauxite Sector	747	674	589	490	505	428	429
- in %	82.0	80.0	76.5	75.7	76.6	73.4	73.0

Source: Statistical annexes table II.2.1.

The suspension of the Dutch development aid at the end of 1982, which had averaged some US\$ 90 million annually, financing over 90% of the public sector investment program, further worsened the balance of payments situation, creating in time a severe shortage of foreign exchange required to import capital goods for investments and spare parts for existing activities and limited consumption. Suriname's economic performance deteriorated significantly.

Real G.D.P. at market prices declined at an annual average rate of 2 percent. Government's current expenditure rose from 31 to 54 percent of the GDP, widening its current deficits from a 3 percent of GDP in 1981 to 25 percent of GDP in 1986, notwithstanding drastic cuts in development expenditure.





From 1981-1986 gross investments fell from 31 percent of GDP to 6 percent of GDP. (Annex II.1.4).

As grants from the Netherlands were suspended and exports declined more than imports, the Government used its substantial foreign exchange reserves largely for the completion and or preservation of development projects previously financed by Dutch aid and for imports of essential products. The result was a total depletion of reserves in the four years 1983-1986, arrears continued to accumulate, a condition which cannot be sustained any longer. The public sector deficit was financed - as before - by Central Bank Loans, expanding public credit for 1986 by more than 40 percent. Private credit, on the other hand, contracted in real terms over the same period, reflecting the impact of the foreign exchange scarcity on the domestic activity. This expansion in public credit was achieved mainly through increases in money supply putting further pressure on the inflationary process.

Concurrently with the above, government imposed wage and price control measures which led to shortages, and the logical development of a parallel market. Inflation, as measured by the Consumer Price Index grew to 19% in 1986. According to the sectoral contribution to GDP in real terms, there has been some modest growth in agriculture, transportation, storage and communication and a recovery in the industrial sector, combined with an expansionary fiscal policy, which kept real GDP from falling further down than 0.6 percent in 1986.

Within the agricultural sectors the major contributors to production are paddy and rice, shrimps and seafood, bananas and palm-oil. Within the mining sector the main contributors to its growth in real terms were bauxite and its derivatives and the exploitation of domestic oil reserves by the State Oil Company.

Within the Manufacturing sector there was no significant growth as was to be expected due to the shortage of foreign exchange to import the raw materials, while in construction there has been a constant decline. Besides the increase of the public administration within the service sectors, transportation, storage and communication grew with 6 percent average since 1982, mainly because of the investment outlay in communications by State-owned Telephone company.



## 2.2 Balance of Payments

As was the case with the GDP, to better understand the evolution of the balance of payments of Suriname since its independence it is necessary to divide the analysis in two periods, between 1975 to 1981 and 1982 onwards. The first period can be characterized as one of surpluses in the balance of payments due to the inflow of Dutch aid and an increase on export earnings due from bauxite and its derivatives. The latter account for over 70% of total exports (Annex II.2.1).

Suriname can be characterized as a very open economy with a high import to GDP ratio which, at current market prices, was 58% in 1981. Reviewing the trade balance in that period, it is noticeable that merchandise exports compared to merchandise imports grew at a slower pace. The growth of imports was an outcome of the acceleration in consumerism in the economy. Both consumption and imports grew at the same average rate about 20% per annum for the period 1975-1981. Also the increase in gross investment, about 84% for the same period, influenced the trade balance in favor of the merchandise imports.

The composition of the imports by major products group (table II.2.2) indicates that 50 to 55 percent of total merchandise imports consist of raw materials and resources of which some 40 to 50 percent are fossil fuel products. The considerable increase in the value of oil imports between 1978 and 1980 was a result of a drastic raise of the oil-prices on the world market. Imports of consumer goods more than doubled for the period under review as well as the imports of cars & motor vehicles.

In Suriname, export performance depends heavily on the dominant bauxite sector (see Table II.c). There has been a constant growth in total export value during the period 1975-1980. This increase was more a result of large increase in export prices of bauxite and its derivatives than an increase in volume. There was a drop in export volume of aluminum in 1980 and subsequently one of bauxite ore in 1981.

(see Annex II.2.1).



Table II.c SURINAME: PRINCIPAL EXPORT PRODUCTS 1975-1986  
(in million Suriname guilders)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Bauxite & Derivatives exports	378.1	419.9	494.1	550.7	609.1	747.0	673.9	588.5	489.5	504.5	428.3	428.7
Agricultural Exports: Rice, Bananas, Palm-oil	39.0	34.8	36.5	48.8	75.2	86.6	78.5	84.4	80.3	78.6	102.7	83.9
Fisheries Exports: Shrimps, and semi-processed fish	23.7	47.4	51.6	53.2	47.8	56.0	73.7	76.4	66.1	67.1	45.3	70.2
Forestry Exports: Processed and semi-processed	11.6	11.7	11.0	12.3	19.4	21.0	18.6	20.5	11.3	8.7	6.4	4.8
<b>TOTAL</b>	<b>452.4</b>	<b>513.8</b>	<b>593.2</b>	<b>665.0</b>	<b>751.4</b>	<b>910.6</b>	<b>844.7</b>	<b>769.8</b>	<b>647.2</b>	<b>685.9</b>	<b>582.7</b>	<b>587.6</b>

Source: Annexes Table II.2.1.



The next important sector in terms of export earnings is the Agricultural sector within which rice plays the dominant role. Agricultural exports more than doubled in the period under review and rice represented more than 85% of total export earnings. Besides an increase in export-prices (1979-1980) there has been a sharp increase in production and export volume (131.000 tons in 1982 against 55.000 tons in 1977). This was possible due to the preferential status as an ACP country in its relation with the EEC.

The next important export product is shrimps with a total volume ranging between 3000 and 4000 tons per annum. This significant increase in export value came about because export prices of shrimps increased considerably. In 1981, for instance, the export price was three times higher than the export price in 1975. The shrimps are fished mainly by boats operated by foreign companies (Japanese & Korean), and one state-owned processing company SAIL, which manages a local based trawler fleet SUGAM.

The export of wood and woodproducts shows a decrease in volume from 1975 to 1978 while there was a slight increase in value due to a change in the unit prices. Positive changes occurred in 1979-1981 when favourable prices for log exports were obtained in Europe and a contract between Suriname and Venezuela for the delivery of pre-fab houses. Before the period under review (1975-1981) export of agricultural products of significance were citrus, coffee, cacao and sugar. After 1977 there were no exports of these products except for citrus until mid 1980's.

The data on the geographical distribution of exports show that the direction of flow is the reverse to that of imports. Forty percent goes to the USA, 30% to the EEC countries, 15% to Scandinavia and Russia and 5% to the Caribbean countries.

The deficits on the balance for factor services and transfers for the period under review, except for 1981, are principally related to profit transfers by the bauxite companies and other foreign companies.





On the capital account the capital inflow from the Dutch Development Aid played a dominant role. As mentioned previously the accumulation of surpluses on the capital account were sufficient to cover all deficits on the current account, except for 1979. This picture was altered completely when the Dutch Aid was suspended in December 1982. The first signs of deterioration of the balance of payments for the second period 1982-1986 appeared in 1980 when the world market for bauxite and its derivatives started weakening. To sum up the influence of the bauxite sector on the trade balance, including its role in the deterioration since 1980, Table II.d is presented.

Table II.d,

Influence of the Bauxite Sector on the Balance of Payments  
(in millions of Suriname guilders)

Description	1982		1983		1984		1985	
	Baux co.	Rest Econ.	Baux co.	Rest Econ.	Baux co.	Rest Econ.	Baux co.	Rest of Econ.
Exports	609.1	163.2	508.8	145.9	529.9	120.9	437.1	123.7
Imports	218.4	702.8	193.6	610.1	174.1	443.2	162.3	370.6
Trade Balance	+383.5	-539.6	+315.2	-646.2	+355.8	-322.3	+274.8	-246.9
Balance on Service and Transfers	-70.4	-47.2	-67.9	-74.8	-42.2	-71.7	-19.8	-52.6
Current Account Balance	+313.1	-586.8	+247.3	-539.0	+313.6	-394.0	+255.0	-299.5
Public Capital (net)	-	+713.3	-	+3.1	-	+3.9	-	+3.5
Private Capital net (2)	-21.0	+44.1	+72.0	+44.6	-19.6	-5.3	+19.5	+12.2
Capital Account Balance	-21.0	+217.4	+72.0	+47.7	-19.6	-1.4	+19.5	+15.7
Overall Bal.(1)	+292.1	-369.4	+319.3	-491.3	+294.0	-395.4	+274.5	-283.8

Source: Central Bank of Suriname Report 1982-1985

(1) equal to the transfer of bauxite companies to Suriname

(2) including unclassified accounts, capital movements and revaluation differences.



The concurrence of two factors, cessation of the Dutch economic aid and the fall of bauxite and alumina prices in the world market led the sharp fall of export earnings since 1982. The balance of payments continued to register foreign reserves losses since 1982. The suspension of the Dutch aid at the end of 1982 cut virtually all public capital infows. The current account deficits increased from 6.5% of GDP to 17.5% of GDP in 1983. In 1983, due to the government decision to continue its investment program the current account deficit was financed by drawing on about US\$ 110 million down to two months of imports (see Annex II.2.4). Further heavy depletion was prevented by a severe restriction on imports.

Net official reserves, which had stood at US\$ 177 million in 1984 dropped to US\$ 78 million by the end of 1986. Also the "no-funds" imports grew from US\$ 8 million in 1984 to US\$ 43 million in 1986, substantially increasing inflation. Public sector external debts also expanded significantly in 1985 and 1986 and reached a level of US\$ 125 million in 1986 compared to US\$ 41 million in 1982, or 22% and 7.1% of GDP respectively.

This increase was mostly caused by the use of bilateral trade credit lines. Suriname's export prices for bauxite and its derivatives declined constantly from 1982 to 1986. The export price for bauxite-ore fell from US\$ 59 p/ton in 1983 to US\$ 32 p/ton, while the unit price for alumina, the most important bauxite product, dropped by some 42% over the period 1982-1986. The unit price for aluminum also decreased by 22% by US\$ 1530 per ton in 1982 to US\$ 1187 per ton in 1986. Because of internal security problems with the electricity supply from the hydro electrical power dam in the first half of 1987 SURALCO was obliged to shut down its aluminium smelter, which virtually wiped out aluminium exports.

In spite of a consistent decline in export value and in unit prices of aluminium exports, volumes exported, particularly of alumina, increased, partially offsetting export value decline.



Rice, the second product in importance in terms of exports, showed a fluctuating performance during the period under consideration. After a slight recovery in 1982 of volume and value a sharp decline occurred in 1984. After a strong recovery in 1985, exports again declined in 1986, partly because of international competition, severe shortages in local production resources and partly because of domestic substitution to replace maize in livestock feeds.

Banana exports kept increasing gradually over the period 1982-1986 with a shortfall in 1983 of export volume because of excessive rains. The export value increased by more than 50% because of some increases in the export prices

The volume of shrimp exports declined with the fall in production from 1982 to 1985. But because of gradual increases in export prices, increases in export value have been recorded. Semi-processed fish exports increased gradually up to 1984. Because of substitution of fish for chicken in domestic consumption exports fell back to the 1982 levels.

Imports have been declining since 1981 due to the weakening of economic activity and the scarcity of foreign exchange before following the suspension of the Dutch Aid and the subsequent exhaustion of foreign exchange reserves.

Although Suriname does have the potential to increase the export of wood, organizational problems have hampered the forestry sub-sector for years. In addition, the scarcity of spare parts and internal security problems in the east of the country adversely affected exports in 1986.

Exports of oil-palm products also suffered from internal security problems leading to serious setback in production.

The increase in domestic fuel oil production allowed some import substitution although a sharp decline in import values in 1986 was caused by a fall in international prices.



Stringent controls on foreign exchange and import licenses increasingly led to the payment for imports through other channels. After the introduction of severe restrictions on foreign exchange, import arrears appeared and kept increasing. Along with these restrictions "no-funds" imports were permitted, increasing its share to 13.4% of total merchandise imports in 1986. Therefore import figures in fact could be understated due to:

- "no-funds" imports
- imports through credit-lines
- imports by barter agreements
- imports of gift parcels.

The balance on services and transfers deteriorated sharply in 1983 and 1984 before improving in 1985 when restrictions on imports intensified. The increase of the deficits on the balance for services was caused mainly by sharp decreases in receipts of transportation and insurance of goods and passengers. Also the loss of international reserves which cut Suriname's interest earnings abroad turned the surplus on factor income in 1982 into deficits.

Long-term foreign borrowing by the Government increased rapidly following the suspension of the Dutch grants and depletion of official reserves. Total external debt, including external arrears, amounted to US\$ 148 million at the end of 1986. In August 1983 the Government revalued its gold reserves from US\$ 42 per troy ounce to US\$ 397 per troy ounce, and since then it has been adjusting values in accordance with the world market price. The net reserves dropped from US\$ 201.5 million in 1982 to a deficit of US\$ 79.2 in 1986. (See Annex Table II.2.4).

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## 2.3 Public Finance

### 2.3.1 Structure of the Public Sector

The Public Sector in Suriname is the probably the main economic sector. Its share of domestic expenditures increased from 31.5% in 1975 to 46.8% in 1986 while it employs over 50% of the labour force. (see Annex II.1.4)

Central Government current expenditure as a percentage of G.D.P. at current market prices doubled over the period 1975-1986. While on the other hand development expenditure endured a major set back from 13.5% in 1976 to 3.3% in 1986 due to the suspension of the Dutch aid in 1982, which had financed 95% of the development expenditures.

Most Central Government Operations take place through the budget which covers all current receipts and expenditures. Development expenditure recorded by the Ministry of Finance and Planning is mostly carried out through the Suriname Planning Office. Since 1983, a significant part of development outlays were channeled through the National Development Bank and the Agricultural Bank with funding consisting of transfers and external credits such as creditlines and International Bank Credit arrangements.

The social security system consists of the Old Age Fund, the Childrens Allowance Fund, the Social Assistance Fund, the Welfare Fund for Indigents and the Public Health Fund. Except for the Old Age Fund and the Public Health Fund, which are financed through a salary deduction system, all the other funds are financed by the Government.



Some of the large public enterprises suffer great losses and rely heavily on subsidies and loans from the Central Government. In recent years the subsidies and transfers do not cover the amount of losses recorded. The main beneficiaries recently are : the Marienburg Sugar Company, the Electricity Company (EBS), the Shipping Company (SMS), the Dairy Plant, Rice Estate (SML) Wageningen, Mining and Quarrying Enterprise Grassalco and the Government Hospitals.

The public finances during 1975-1980 have been developed within reasonable terms except for 1977. The overall deficit dropped from about 15% of the GDP in 1976 to about 7% of GDP in 1980. This was made possible by generation of current account surpluses in 1978-1980 due to a recovery in bauxite levy receipts and by an acceleration in the collection of taxes on income and profits. Also a successful attempt to reduce Government expenditure, especially on wages and salaries, played an important role.

A major contributor to the overall deficit was the development expenditure of the government on public outlays, which also declined over the period 1978-1980 with 23.0%. The development expenditures were almost totally financed through the Dutch Development Aid. The public finances began to weaken in 1981-1982 as current expenditure rose rapidly, while revenues out of the bauxite sector started their decline. Suspension of the Dutch Aid further accentuated the deterioration decreasing the current account from a modest surplus in 1980 to a deficit equivalent to 25% of GDP in 1986. Table II.e, which follows, summarises the operation of Central Government finances from 1975 to 1986.



Table II.e.1 Suriname: Central Government Operations 1975-1986  
(in million Suriname Guilders)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Current												
Revenues	289.3	288.2	339.4	415.9	435.7	490.0	504.6	546.3	487.4	499.6	491.1	498.9
Current												
Expendi- tures	250.1	306.4	387.2	392.8	427.0	497.3	554.0	648.4	703.9	735.2	793.5	937.9
Current												
Account												
Surplus/Deficit	48.2	-18.2	-47.8	23.1	8.7	10.7	-49.4	-84.1	-216.5	-235.6	-302.4	-439.0
Development expenditure	109.3	136.7	153.8	145.2	132.8	118.3	174.8	189.4	133.5	89.6	65.2	58.2
Overall												
Surplus/Deficit	-61.1	-154.9	-201.6	-122.1	-124.1	107.6	-224.2	-273.5	-330.0	-325.2	-376.6	-497.2
Financing	-61.1	-154.9	-201.6	-122.1	-124.1	-107.6	-224.2	-273.5	-330.0	-325.2	-367.6	-497.2
Domestic	-6.4	0.8	67.5	-13.7	-19.1	-19.8	54.9	98.4	306.3	318.4	362.2	457.9
Foreign	67.5	154.1	134.1	135.8	143.2	127.4	169.3	175.2	23.7	6.8	5.4	39.3

Source: Ministry of Finance and Central Bank



Table II.e.2 SURINAME CENTRAL GOVERNMENT OPERATIONS 1975-1986  
(in percentage of GDP)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Current Revenues	32.0	28.5	26.5	28.3	27.8	30.6	28.0	30.5	27.3	28.6	28.2	28.5
Current Expenditure	26.8	30.3	30.2	26.7	27.3	29.9	30.8	35.1	39.4	42.1	45.5	53.6
<u>Current Account Surplus/Deficit</u>	5.2	-1.8	-3.7	1.6	0.6	0.7	-2.7	-4.5	-12.1	-13.5	-17.3	-25.1
Development Expenditure	11.7	13.5	12.0	9.9	8.5	7.4	9.7	10.2	6.4	5.1	3.7	3.3
<u>Overall Surplus/Deficit</u>	-6.5	-15.3	-15.7	-8.3	-7.9	-6.7	-12.5	-14.8	-18.5	-18.6	-21.1	-28.4

Source: Ministry of Finance and Central Bank





### 2.3.2 Current Revenues and Grants.

Through improvements in the tax collection system, tax revenues increased (68% from 1976 to 1981) at a constant pace in nominal terms. In terms of GDP total revenues averaged some 28.7% between 1975 and 1986. Contribution of tax revenues averaging 87% of total revenues during 1975-1981, fell by more than 10% to 75% of total revenues in 1986. Out of the main tax revenue sources: taxes on income and profit, taxes on goods and services, and taxes on international trade, the latter two have grown in accordance with the modest economic growth from 1975-1982 but have also suffered from the deterioration that occurred from 1982 until today. Taxes on income and profit grew steadily from 1975 to 1980 due to the increase in economic activity. The share in tax income of the bauxite sector increased from 1976-1980 to about 36% after a sharp decline from 1972 to 1975. Income tax revenues out of this sector started to decline after 1980 with the weakening of the bauxite sector and were virtually nil in 1986.

Also taxes on goods and services started to decline after 1980 as bauxite levy receipts, which averaged about Sf.90 million per annum from 1975 to 1981, declined sharply and were abolished in 1986 by the Government. The sharp fall in taxes out of the bauxite sector in 1986 were offset by skimming off the price difference between import prices and pumpprices of gasoline due to sharp fall of the world marketprices of oil. Within the taxes on international trade the import duties contribute over 90% of the receipts. The fast growth of imports from 1975 to 1982 and relatively high customs duties led to a significant increase in the share of the revenues from the taxes on international trade.

Subsequently decline in imports of nearly 40% due to the increasing shortage of foreign exchange, affected the taxes on international trade severely. The decline in import duties would have been sharper, were it not for an expansion in "no-funds" license imports in 1985-1986, a large part of which consisted of high-duty consumer durables.



Within the non-tax revenues the contribution of Central Bank profits grew from 23% in 1975 to a level of 58% in 1983 but with the depletion of monetary reserves it dropped to a 39% in 1986. Other important contributors to non-tax revenues are the contributions to the pension and social security funds, and administrative fees.

Development grants started to flow in 1975 after independence from Holland, when a Development Assistance treaty was drawn up obligating Holland to remit about Nf. 3.5 billion over 15 years of which Nf. 2.5 billion was a grant. This development aid was meant to be spent on development projects put forward in the Multi-year Development Plan. This treaty made it unnecessary for Suriname to engage in foreign borrowing to finance its development expenditure. This picture was altered completely when the Dutch aid was suspended in December 1982. The Government has not been able to adequately compensate for these losses of capital inflows after 1982.

### 2.3.3 Current Expenditure

While during the late seventies the increase in current expenditure kept in pace with that of current revenues this situation started to change in the beginning of the eighties and has aggravated in recent years. From 1975 to 1980 current expenditure grew at an average rate of 15.2% except for 1977 when it was 26.4% mainly due to increases in wages and salaries, and in expenditures on goods and services. From 1981 to 1986, however, these rates of increases ranged between 4.4% and 18.2% and the implication for the Government was devastating. By the end of 1986 current expenditure measured about 53.6% of GDP compared to 26.8% in 1975. (see Tables II.e.1 and II.e.2).



For the period under review more than half of current expenditure consisted of payments of wages and salaries. This pattern is a consequence of the increase in number of people employed by the Government.

In 1975 the number of employees was 25 400, equal to 29.3% of the labour force and by the end of 1986 it reached a total of 42 500 or 52.9% of the labour force. (see Annex Table II.5.4).

Not only the number of people employed is to be considered but also the large wage adjustments (particularly in 1977, 1981 and 1984) in five years, from 1982 to 1986, the government wage bill increased by some 10 percentage points of GDP. The next important expenditure was that expenditure on goods and services that increased by fivefold in nominal terms from Sfl 66.0 million in 1975 to Sfl 332.6 million in 1986. Substantial accruals appeared in 1981 and 1986, in part caused by the increase of expenditure on military arsenal. At the same time most of the increases represented expenditure overruns a result of poor budgetary control. Another significant portion of current expenditure went to subsidies and transfers, which increased from 4.4 percent of GDP in 1973 to 8 percent of GDP in 1985 and declined to 6.4 percent of GDP in 1986, largely as a result of delays in releasing transfers to both the pension fund and public enterprises.

The main reasons for the sharp rise in 1980 and following year were the make up of arrears in payments to the pensions fund, childrens allowance and old age benefits, which was further raised by lowering the pensionable age. Another increase of nearly 50% took place in 1984 when the amount of old age pension was raised. The subsidies to public enterprises increased significantly from 1982-1985 and afterwards declined in 1986 reflecting the decision of the Ministry of Finance to discontinue such transfers and to led the enterprises borrow from commercial banks instead.



For 1987 it may be expected that subsidies and lending to public enterprises will again increase because of the situation of the balance of payments affecting the production process through shortages of imported inputs and also because of continuing internal security problems in the east of the country where some large public enterprises have been operating. The public sector development expenditure, which was almost fully financed through the Dutch Aid starting in 1975, had averaged some 10% of GDP during the period 1975-1982 except for 1979 and 1980 when there was an insufficiency of sound projects to finance. Peak levels were reached in 1976-1978 when the first stages of the West-Suriname project (including the rail road) were implemented and in 1981-1982 were most of the effort was in executing agricultural projects, housing projects and telecommunication projects.

Following the suspension of Dutch Aid, public development outlays decreased by 40% in 1983, 21% in 1984, 27% in 1985 and by 11%, equal to 3.3% of GDP, in 1986. Almost 80% of development expenditure in 1983-1986 was related to ongoing projects and as virtually no foreign financing was available in those years, the deficits were almost fully financed through the domestic banking system. Starting in 1984 a small but increasing part of investment has been financed by official credit lines. Bilateral credit-lines predominantly financed import-substituting projects.





#### 2.3.4 Public Debt

Along with the Dutch Aid that Holland provided as part of the settlement at Independence the outstanding debts of Suriname to the Netherlands were also waived. The external debt situation and the availability of investment funds became very favourable to Suriname. Suriname's external debt fell from 211 million to 22 million Suriname guilders at the end of 1975 (2.4 percent of GDP at current market prices). External debt increased in 1978 to a level of 3.8 percent of GDP when the Government financed the West-Suriname railroad with a 50-million Dutch guilders loan from the Dutch commercial bank. The Government debt is largely a matter of domestic debt. (see Table II.f).

Traditionally almost the entire Government deficit has been financed through credits from the Central Bank. Between 1975 and 1981 the domestic debt averaged below 7% of GDP and afterward gradually deteriorated from 10.1 percent in 1982 to 93.2 percent in 1986 of GDP. At the end of 1986 the external debt amounted to about 7 percent of GDP. Of the domestic debt at the end of 1986, about 93 percent was held by the Central Bank.

With the suspension of the Dutch Aid in 1982 the Government was obliged to finance its development expenditure by drawing on bilateral credit lines, suppliers' credits from Taiwan, China and Brazil and a countertrade with an Italian Company (FIAT). Recently the Government signed some agreements for co-financing of projects with the Inter-American Development Bank.



Table II.f

- SURINAME: GOVERNMENT DEBT -  
(in millions of Suriname guilders)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
<u>TOTAL</u>												
<u>DEBT</u>	41.8	38.7	103.9	128.1	106.0	83.3	134.5	228.2	546.7	871.0	1259.3	1756.3
<u>Domestic</u>												
<u>Debt</u>	19.8	19.0	86.5	72.8	53.7	53.9	88.2	187.2	493.5	811.9	1174.1	1632.0
of which												
<u>Banking</u>												
<u>System</u>	8.6	7.5	75.0	62.5	41.0	19.3	73.2	167.2	476.1	761.1	1118.0	1574.3
<u>External</u>												
<u>Debt</u>	22.0	19.7	17.4	55.3	52.3	49.4	46.3	41.0	53.2	59.1	85.2	124.3

(in percent)

<u>TOTAL</u>												
<u>DEBT</u>	4.5	3.9	8.1	8.7	6.7	5.2	7.5	12.3	30.6	49.9	72.3	100.3
<u>Domestic</u>												
<u>Debt</u>	2.1	1.9	6.7	4.9	3.4	2.1	4.9	10.1	27.6	46.5	67.4	93.2
<u>External</u>												
<u>Debt</u>	2.4	2.0	1.4	3.8	3.3	3.1	2.6	2.2	3.0	3.4	4.9	7.1

Source: Central Bank of Suriname.



### 2.3.5 Banking Intermediation

#### 2.3.5.1. The Financial System

The banking system comprises the Central Bank and six commercial banks of which the largest, the Suriname Bank and the Algemene Bank Nederland are affiliated with a Dutch Bank. The other banks are majority or fully owned by the Government. Not consolidated up to very recently in the banking statistics were the National Development Bank (N.D.B.), a small private mortgage bank, a finance company, insurance companies, pension funds and credit unions, but measures were taken to include these companies under the regulations of the Central Bank monetary policy.

The Central Bank of Suriname is the monetary authority as defined by the Bank Ordinance of 1956. It is empowered with the supervision of Bank and credit arrangements, to regulate financial institutions, protect the soundness of the financial system, provide financial services to the Government and conduct the monetary policy. The Central Bank is invested with the authority to impose reserve requirements and liquidity ratios, prohibit certain types of credit, conduct open-market operations as well as establish credit ceilings on individual banks.

Traditionally, the Bank has relied on credit ceilings as its main policy instrument. The Bank is not always able to control monetary expansion within the framework of the Bank Ordinance. e.g. the Bank had no or little, influence upon the inflow of external development aid which, of course, was a major source of money supply expansion when compared to domestic credit lending.

Public spending and financing also are beyond the Bank's influence. By tradition the Central Bank has not used interest rates as a policy instrument; the commercial banks are free to set both deposit and lending rates.



### 2.3.5.2. Monetary and Credit Development.

For most of the 1975-1986 period, the banking system's resources, under the form of liabilities to the private sector, increased faster than its net domestic assets.

Between 1975 and 1986, private sector liabilities increased every year at double digit rates except for 1980, when political uncertainty arose caused by the Revolution. Also the low growth figure in 1983 was the outcome of political uncertainty after the suspension of the Dutch aid in December 1982. In 1975-1986 the average growth rate was 19.1 percent. This income generating effect was the result of the inflow of Dutch Development Funds and of structural current deficit financing of the Government budget. (See Annex II.4.1)

Table II.g. Suriname. Banking System Liabilities to the Private Sector  
1975 - 1986  
(Annual percentage change)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total												
Liabilities	17	32	19	23	14	9	18	10	12	16	27	24
Liabilities												
to the Private												
Sector	20	35	21	19	14	8	19	11	10	18	29	25
Monetary												
Liabilities	20	18	11	12	11	8	22	18	8	8	55	51
Currency in												
Circulation	12	24	14	16	8	14	11	36	-1	15	33	27
Demand												
Deposits	31	11	6	7	16	-1	38	-5	11	-1	91	79
Other												
Liabilities	17	59	26	24	15	8	18	5	12	28	13	4
Quasi-Money	16	62	27	21	12	8	17	6	13	14	12	2
Other												
Liabilities	24	18	18	79	64	11	28	2	4	169	17	13
Private												
Capital and												
Surpluses	31	25	49	26	19	13	12	14	7	5	15	7

Source: Central Bank





During 1976-1980 the total growth in monetary liabilities of about 59 percent kept in line with the total growth of the GDP of 60 percent for the same period. While the GDP started to decline after 1982 the monetary liabilities kept growing at a quicker pace, especially for the years 1985 and 1986 where the growth rates were about 50 percent annually. (see Table II.g)

This evolution of the money and credit markets in Suriname since 1980 has been dominated by the rapid increase in public sector borrowing. During 1982-1986, the net domestic assets of the banking system grew by about Sf. 1.8 billion, of which Sf. 1.5 represents net claims on the public sector. Indication for 1987 are that this figure must have surpassed over Sf.2.0 billion. This credit expansion led to a depletion of international reserves of Sf. 386.4 million in 1983 and 1984 and subsequently through a build up of external arrears up to Sf. 141.5 million at the end of 1986.

In terms of GDP, the stock of public sector debt to the banking system during the period 1975 - 1982 was favourable but after 1982 it jumped from 9.6 percent in 1982 to 91.8 percent in 1986. To meet the public sector's growing borrowing needs after 1982, the Central Bank was not able to maintain the liquidity ratio (defined as  $M_2$  over GDP) as its monetary policy benchmark. This ratio which averaged around 46 percent during the period 1975-1982 had climbed to 123 percent by the end of 1986. Moreover the monetary liabilities ( $M_1$ ) increased rapidly from 22.8 percent of GDP in 1982 to 66.2 percent of GDP in 1986. This excessive monetary expansion aside of the depletion of the monetary reserves impinged on the coverage ratio, set forward in articles of the Bank Ordinance of 1956 prescribing that the Central Bank's holdings of gold and other net international reserves should at least be equal to 50 percent of its noncapital liabilities.



Table II.h SURINAME: BANKING SYSTEM LIABILITIES TO THE PRIVATE SECTOR  
1985 - 1986  
(as percent of GDP)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total												
Liabilities	37.8	46.1	43.2	46.2	49.5	52.4	55.2	59.1	68.6	81.6	104.0	128.9
Liabilities to the Private Sector	34.9	43.5	41.3	42.9	46.0	48.6	51.6	55.6	63.4	76.7	98.8	123.2
Monetary Liabilities	18.1	19.7	17.1	16.7	17.5	18.4	19.9	22.8	22.5	28.3	43.9	66.2
Other Liabilities	14.3	20.9	20.8	22.4	22.3	25.6	27.0	27.6	32.2	42.2	47.8	49.3
Private Capital and Surplus	2.5	2.9	3.4	3.8	4.2	4.7	4.7	5.2	5.8	6.2	7.1	7.6

Source: Central Bank of Suriname.

The coverage ratio declined from 125.5% in 1981 to 7.4% in 1985, which is the result of structural public budget deficit financing. To fulfil the regulation, in 1983 gold reserves were valued at world market prices and the coverage ratio was lowered by steps to 5 percent by 1984.

Money creation through fiscal deficit financing by the Central Bank, together with weak credit demand from the private sector increased the reserve holdings of the commercial banks at the Central Bank substantially. These reserve holdings with an average of 12 percent of the commercials liabilities to the private sector for the period 1975-1982 increased to 51 percent at the end of 1986.



The variation in the credit expansion by the banking system during the period 1975-1982 has been dominated by rapid growth in credit to the private sector through the commercial banks. After the suspension of the Dutch Aid in 1982 and the deterioration of the balance of payment the growth in credit demand from the private sector slowed down. The sectoral destination of credit (see Annex Table II.4.4), indicates that the share of credit for manufacturing and commerce declined substantially probably as a result of the restriction on international trade. In recent years the agricultural sector category as well as the credit category 'others' have become the main beneficiaries. Housing and consumer credit, increased significantly, reflecting probably the increase in the financing of property and real estate as a hedge against inflation. Though the commercial banks are extremely liquid, they apparently have no intention to lower their lending rates despite sluggish loan demand and indications that a substantial amount of transactions are financed outside the banking system. Although the Central Bank is authorized to use interest rates as an instrument of monetary policy in Suriname it have never relied on this authority. The commercial banks are free to set both deposit and lending rates. Interest rates for commercial bank loans, savings and time deposits have remained rather flat since 1975.

Interest rates for commercial loans to the private sector are between 5 and 7 percent: the rates on consumer loans 9 to 10 percent while the rate for mortgages varies between 10 to 15 percent. On the other hand interest on savings accounts have been set at 3 percent for years now, while savings and time deposits vary from 5 to 9 percent.

From 1975 average rates in real terms were nearly negative until 1982 - 1984 when the average rates become slightly positive for both lending and deposit rates.

After 1984 interest rates on all deposits declined from 4.6 percent to 2.5 percent in 1986. (See following Table II.i)



Table II.i

Suriname: Interest rates of Commercial Banks  
(In percent; average rates end of year)

	1982	1983	1984	1985	1986
<u>IN NOMINAL TERMS</u>					
Lending rate	9.1	8.9	9.0	8.9	8.8
Savings and time deposit rate	5.0	5.0	5.5	5.3	5.2
All deposits	4.2	4.2	4.6	3.0	2.5
<u>IN REAL TERMS <sup>1)</sup></u>					
Lending rate	2.4	4.8	4.3	- 6.0	-16.3
Saving and time deposit rate	-1.4	1.1	1.3	- 9.1	-19.1
All deposits	-2.2	0.3	0.1	-11.1	-21.2
<u>MEMORANDUM ITEM</u>					
CPI (Percent change; end-of-period)	6.5	3.9	4.5	15.8	30.0

1) Nominal rates deflated by the end-of-period rate of increase of CPI.

Source: Annex II.4.5

In addition, banks, facing an excess of funds, stopped paying interest on demand deposits in 1985, put a ceiling on the monthly amounts on savings accounts and refused to accept more interest-bearing time and savings deposits. (See Table II.g).

Real rates on both deposits and loans became increasingly negative starting in 1985, as inflation accelerated.





## 2.4 POPULATION, EMPLOYMENT, WAGES & PRICES

### 2.4.1 Size, Growth & Structure of the population

Although data concerning social-demographic composition of the total population of Suriname, on employment and on wages, are based largely on the general censuses, held in 1964, 1972 and 1980, these figures are still subject to a substantial margin of error.

Data concerning prices and price indices are based on a 1969 consumption basket, covering only retail prices (of which some are controlled by the Government).

Since 1985 responses from the household surveys have been included in the calculation of the CPI, which has helped capture, at least partially the phenomenon of parallel market prices.

The growth of the total population of Suriname since 1974 has been characterized by two waves of emigration to the Netherlands (1975-1980). In November 1980, after the expiration of a five-year agreement on the right to opt for Dutch citizenship, the Dutch immigration requirements tightened, since then emigration to Holland declined.

It is striking to compare the total population figures at the end of 1985 (388.261) with those of 1973 (384.175). They do not show great differences and a zero growth rate can be assumed. The average natural growth rate of 2.3 percent for the period 1972-1985 was largely offset by the very high negative migration balance. (Annex II.5.1). The estimate of population as of July 1, 1986: 387 100, indicated that further negative growth rate can be expected for 1986.

The latest figures of total population on age, sex and district are of 1980. Suriname has a very young population with about 40 percent between the age of 0 - 14 years and 30 percent between the age of 15 - 29 and a rather stable balance in gender distribution (Annex II.5.2).



Considering the figures in Table II.j, emigration appeared among the more skilled people, leaving behind a younger, less skilled, labour force. Despite this undesired evolution Suriname educational data showed that about 50 percent of the population in 1980 between the age of 0 - 29 had received some education. (Annex II.5.5 and II.5.6).

Table II.j: Suriname: EMIGRATION FROM SURINAME TO THE NETHERLANDS BY AGE AND GENDER.  
(Average for the period 1972 - 1980)

<u>AGE CATEGORY</u>	<u>MALE %</u>	<u>FEMALE %</u>
0 - 14	37.8	36.3
15 - 64	60.1	61.3
65 and older	2.1	2.4
TOTAL	100.0	100.0

Source: CBS Netherland

The illiteracy rate in Suriname for 1980 is presented in table II.k.

Table II.k. Suriname: ILLITERACY RATE FOR 1980

<u>Age Category</u>	<u>Male %</u>	<u>Female %</u>
15 - 29	10.3	11.9
30 - 59	19.3	34.3
60 and older	40.2	51.6
Total 15 and older	17.1	25.3

A literacy campaign called ALFA-84, was conducted in 1984 through the entire country, but no figures are available on the result.



#### 2.4.2 Employment and Wages.

The data of the 1980 household census indicated the total number of unemployed to be 14.229 or 14.6% of the labour force (Annex II. .3). In mid-1980 a household survey was conducted in Paramaribo and in the district of Suriname by the Bureau of Statistics. Although the job opportunities were on the increase, while population was constant, it was found that unemployment rate had increased to 24% of the working force.

Estimates for 1987 are that the rate of unemployment must at least be around 30 percent or 40.000 people unemployed.

Development brought by the Dutch Aid, up till 1982, did not actually influence the employment rate because the increase in number of available positions by sector was concentrated on Government Services while in other sectors there has been a constant decline in the number of jobs except for 1980 and 1981 where some increases in other sectors occurred. (Annex II. .4).

After 1982, employment decreased in all sectors except in Government (where employment rose by some 20 percent from 1982 to 1986) and in public utilities and transportation (where employment remained stable). Government has acted as a employer of last resort. Growth in production in the Agricultural sector is mainly a result of mechanization. The increase in production was mainly due to the expansion of rice planted area, with capital intensive methods, which actually led to further decrease in employment.

The bauxite mining and processing sector suffered labor lay-offs caused by capital in investments and change in production activity. In 1986 the aluminum plant was shut down because of damage to the powerline from the hydro-electric plant Afobakkadam. Within the secondary sector employment in the manufacturing and construction sector was hit mostly by the suspension of the Dutch Aid, while in the service sector the Trade and Tourism sectors also suffered.



In 1986 and 1987 security problems in the East of the country led to a further decline in employment, mainly in Agriculture, Forestry and Mining sectors. In an attempt to limit unemployment and dismissal of personnel a decree was introduced by the Government prohibiting lay-offs for economic reasons without authorization by the Ministry of Labor.

Also the employment of foreigners and the renewal of working permits for foreigners was severely restricted. During the period 1983-1986, some 270 companies requested a suspension of the decree in order to lay off some 3.500 staff, including 500 staff of SURALCO.

Wages in Suriname compared to regional standards can be considered relatively high. The bauxite mining and processing sector with high productivity level made substantial wage increases possible. The bauxite sector and, in recent years, the financial institutions, were acting as a impelling factor on wages in the other sectors. The average gross labor cost in the Bauxite sector increased from Sfl 24.000 in 1980 to Sfl 41.679 in 1985, four times higher than those in the Government sector and more than eight times compared to those in the agricultural sector. However, earnings in the agricultural sector are not the only income for the farmer who usually farms on part-time basis. It can be safely assumed that a constant growth of the agricultural sector and an increase in cooperation in Suriname in the recent years allowed for more reliable annual income for those involved in agriculture (see Annex II.1.1, II.4.4 and II.5.4

Labor cost in all sectors during the period 1975-1982 has increased significantly, well above the Consumer Price Index, but this was followed by moderate increases for the period 1983-1985. While there is no data at hand it can be assumed that for 1986 and 1987, considering information on collective bargaining agreements, a wage moderation started. In fact, taking into account the CPI for 1986 (see Annex II.5.8) and that of 1987 (estimates are 54.8%), there is no positive real wages increase.





The trade unions, which started their activities in the late 1960's, acknowledged the economic deterioration and have recently concentrated more on job security rather than on wage increases.

There is no legal minimum wage in Suriname, but most collective wage agreements stipulate a minimum wage. Labor disputes are solved through an arbitration board whose decisions are not binding.

### 2.4.3 Prices

The openness of the Suriname economy and the pegging of the guilder to the US dollar have been the most important external factors influencing local prices. The appreciation of the dollar against the currencies of European countries which are Suriname's main trading partners, increased the import prices. Also the substantial increases in oil-prices in 1974 influenced the local price index. But also local factors such as increases in import duties in 1973, and spending behaviour, caused by increased inflow of foreign capital for investment projects after 1975, are to be considered.

When considering the relative weights factor in the CPI, the prices of "food and beverages" and "housing and furnishing" are the major determining categories for price changes also the category "clothing and footwear" (see Annex II.5.8). In 1981 the decline in the inflation rate in Suriname reflected the decline of the inflation rate in industrial countries, where in the recuperation of the dollar and stability in oil prices played an important role.

But also the intensification of price controls and the adoption in 1984 of a new decree which allows the Government to fix prices or profit margins were of importance.



During 1986, the price control system was liberalized. With the scarcity of foreign exchange, imports under no-funds licences (for which no foreign exchange is provided by the Central Bank) were allowed to be sold at prices which cover the cost of foreign exchange in the parallel market. With the intensified import restriction and the appearance of parallel market activities the General Bureau of Statistics changed its procedures of compiling CPI data by collecting price information through household surveys and using it, together with retail prices, to estimate the Index.

After a rather stable inflation rate from 1981 until 1984, the inflation rate picked up in 1985 and set at 18.7 percent in 1986. Estimation for 1987 were that the inflation rate reached a 54.8 percent.

Very recently the Government reactivated and increased the operations of the Market Intervention Bureau which has to see to it that basic foodstuffs are equitably distributed to all consumers at official prices.



### III THE AGRICULTURAL SECTOR

#### 3.1 Agriculture in the Economy

After the mining sector - including Alumina processing - the Agriculture sector is the most important, particularly in respect of foreign exchange earnings. Agriculture accounts for 25%, i.e., almost all of the non-bauxite export earnings, and employs 14% of the labour force.

The sector has performed well in the past and has considerable potential for further strong growth.

For the period 1975 - 1980 this sector enjoyed an annual growth rate of 52%. In the succeeding five year period, 1981 - 1985 Agriculture performed much less well, with a negative average growth of -1.0%, but enjoyed a sharp recovery during 1986 when it achieved a rate of 3.8% (See ANNEX II.1.1).

Agriculture's contribution to GDP grew at a fairly constant rate over the period 1975 - 1986 (except for the year 1983). The contribution, at constant prices, grew from 7.6% in 1975 to 9.7% in 1986. Despite this growth, the sector performed below expectations. When one compares the performance of the different types of Agriculture production, by such measures as acreage and yields, only rice and palm oil had positive growth. (See ANNEX III.1.1). This indicates the dominant role of the rice sub-sector and the increasing importance of oil palm.

The Fisheries sub-sector has also played a very important role over the last decade, with the export earnings from shrimping almost as high as those from rice. Further growth prospects are favourable, providing Government policies continue to be supportive.

In the livestock sub-sector the main growth enterprises have been cattle, and, to a somewhat lesser extent, chicken and pork. These last enjoyed moderate growth over the last decade, but suffered some major setbacks in 1986 due to the scarcity of imported feed ingredients.

This sub-sector has the ability to expand significantly, provided the essential inputs can be guaranteed.



## 3.2 Commodity Trends 1975 - 1986

### 3.2.1 Rice

Rice is the single most important agricultural enterprise in Suriname. Production is concentrated in the North-Western district of Nickerie. Up to 1979, 95% of all padi was grown in the district, and, even though this had dropped to 82% in 1986, it is still by far the most important rice area. (See ANNEX III.1.1). With the development of the Multi-Purpose Corantijn (irrigation) Project (MCP) rice production in Nickerie will be the undisputed crop of the future for Suriname.

Rice is fairly highly mechanized with about 150 combine-harvesters for a total cultivated area of 75,000 ha. This high degree of mechanization may be seen in ANNEX III.1.6 which indicates the distribution of production between small (37%) and large farms (63%) and the constant increase of small farm yields - 40% over the period 1975 - 1986.

Another factor of importance in the development of the industry is the growing cooperation between small farmers which makes greater possibilities for mechanization and other labour saving technologies.

The production of padi (at 14% moisture) increased by 72.2% from 1975 to 1982 and since then stood at around 300,000 tonnes annually, except for 1983 when unfavourable weather conditions caused a decrease in production. This substantial increase has resulted from an increase in the area planted by about 52%, the expansion of double cropping and several technological production improvements during the same period. Further increases in production after 1982 were not realized because of the scarcity of foreign exchange which was required to purchase essential production inputs.

Most of this increased production has been exported to Europe (75%) and the Caribbean countries (25%). Export quantities increased by over 138% of the period 1977 - 1982 and subsequently decreased. 1986 was 18% less than 1982.





The most common problem related to losses or decreases in padi production is the lack of irrigation. And after 1982 the second major constraint of production was the lack of foreign exchange which is required for purchasing machinery, spare parts, pesticides and fertilizers. In addition there has been a problem, particularly after 1982, of obtaining good seed of improved padi selections.

Despite all of these drawbacks, yields on many private farms are higher than on the Government owned SML - Wageningen. (a large government investment in rice production in LOC - the Commewijne Agricultural Project has been suspended after sustaining heavy losses).

Although yields have been increasing on small farms the acreage under small farms has grown at a much slower rate (21%) than that under large rice farms which increased by as much as 85%.

With the completion of the MCP canal and the development of the secondary and tertiary irrigation channels, there are excellent opportunities for further substantial increases in production resulting from the increase in water availability during the dry season, the rehabilitation of old polders and the opening up of another 6400 ha. of new polders.

As pointed out in Chapter II, rice is the most important export product after bauxite and bauxite derivatives. Rice exports reached highest levels in 1980 - 1982 with export value at about US\$ 40 million and an average volume of 131,000 tonnes annually. After 1982 there was a sharp drop down to US\$ 35 million and a volume of 108,000 tonnes, but in 1985 volume exported increased to 125,000 tonnes

(ANNEX II.2.1). Rice is sold under quota to the EEC which is Suriname's main market. By agreement under the Lome convention Suriname enjoys a 50% discount on duty for cargo rice (but not for white rice). Exports to Europe in 1980 were comprised of 85% of cargo rice and 15% white rice.

In 1979 the contribution of SML to rice for export was approximately 60%, but this has dropped to less than 25% at the present time.



Preliminary estimates for 1987 are for no significant change in production volume due to the continued shortage of foreign exchange for the purchase of machinery spares.

### 3.2.2 Oil palm

Oil palm is Suriname's main perennial crop but a distant second in economic production to rice. There is a total planted area of 6125 ha. Most of the Oil palm is planted in three plantations in the middle of the Eastern half of the country. The plantations Victoria, Phedra and Patamacca are all fully owned by the Government and are jointly managed by one office in Paramaribo.

Total plantings increased by 272% from 1975 to 1986, and producing acreage grew nearly 700% to 4212 ha. producing 30,300 tonnes of fresh fruits in 1986. (See ANNEXES III.1.1. 1.2 and 1.9).

In 1980 there was a drop in production due to an outbreak of the weevil borer pest Cyparissus daedalus (Castnia). In 1986 production levelled off and then virtually ceased as a result of internal conflicts of a military nature in the East of the country, conditions which continued through most of 1987. Toward the end of 1987 the plantations at Victoria and Phedra were reopened and cleaned up and harvesting was restored. More recently access was regained to the Patamacca plantation which lies further East and there clean-up operations have begun.

Unfortunately, a disease condition known as "Spear Rot", for which the causal factor is unknown, is currently decimating the Victoria plantation and is slowly spreading at Phedra. The extent of its incidence at Patamacca is not yet known with any precision. Before the advent of this disease the production was projected to peak in 1995 with a tonnage of around 53,000 tonnes producing 10,500 tonnes of crude oil. At this time, until more is known about the disease and some form of control is devised, no valid projection can be made.



The refinery at Victoria started operation in 1977. Until that time all of the crude oil was exported, but subsequent to 1981 - 82 only small amounts continued to be exported. Exports of stearin increased by almost 2000% between 1977 and 1985. Exports of palm oil earned Sfl 3.0 million in 1979, but during the years since then averaged only Sfl 1.0 million annually.

A second refinery is being constructed at Patamacca, at which time, if the plantation survives the 'spearrot' disease, it may be expected that exports would rapidly increase.

### 3.2.3. Bananas

From the early 1900's there have been several attempts to develop an export trade in bananas from Suriname, in the face of many constraints. It was not until 1957 that there was successful reception of a sample shipment to Holland. Surland, a parastatal company, was established in 1971 to manage the banana plantations. At this time Surland N.V. owns three banana plantations and one rice farm and employs about 1600 people. One banana plantation is in the Nickerie district and covers 1000 ha. of which 800 ha. is planted. The other two fields and rice plantation are in the Jarikaba area some 20 km West of Paramaribo. In these areas 950 ha are planted out of a total of 1050 ha.

The bananas are sold to Fyffes Group Ltd. in London and about 70% exported to the United Kingdom and 30% is exported to Italy. The export over the last 16 years was as follows:



Table 3.2.3 BANANA EXPORT FROM SURINAME 1971 - 1986

	Export (tonnes)		Export (tonnes)		export (tonnes)
1971	37336	1976	36987	1982	37483
1972	38138	1977	27287	1983	32159
1973	29773	1978	29020	1984	34932
1974	34602	1979	27332	1985	37340
1975	38265	1980	33909	1986	35997
		1981	36488		

Source: Surland N.V.

Bananas are very labour intensive crop and the only mechanization is in transport of the fruit from the field to the boxing stations by cableway, the digging of the drainage canals and ditches by machines and the application of fungicides by aircraft.

The soil in this coastal area of Suriname is not ideal for growing bananas. It is a very heavy marine clay which is very fertile but has a bad structure which causes waterlogging. Therefore the bananas are grown in polders on beds with a drainage ditch every six metres. This drainage system is very expensive to build and to maintain but it is essential. Another related problem are nematodes which attack the bananaroots. Because of the heavy clay there are no pesticides that can penetrate well enough to destroy the nematodes. Therefore heavily infested areas are flooded for six months after which these areas can be planted again. In practice this means that every field produces for about seven years and after flooding for six months can be planted again and the cycle starts again.





A third problem is the Yellow Sigatoka, a fungus disease attacking the leaves. To keep this disease under control Surland has to spray every 14 days and this costs about US\$ 500,000 per year. As bananas are very labour intensive Surland employs one man for every two hectares. The take home wage is about \$ 18 to \$ 23 US per day for which the labourers work about six hours per day. Further Surland supplies free medical care and a pension fund. Labour costs are 65% of total costs. A good percentage of the workers are immigrant labour, mainly from Guyana and Haiti.

The rejects from the packing plant, which amount to about 10 - 15% of the total harvest, are marketed locally, some for local consumption but the bulk for cattle and pig feed.

Since 1975 total export values have risen steadily from a level of Sfl 6.0 million to around Sfl 20.0 million in 1986.

#### 3.2.4 Sugar

At one time sugar was an important export crop in Suriname, exporting to the EEC preferential market under quota of 8000 tonnes. This quota was lowered to 4000 tonnes in 1970 but even then this level was achieved only once, in 1978 (See ANNEX III.1.8).

The sole plantation left in sugar is the Marienburg Sugar Estate which harvests around 1900 ha. Yields here have averaged 70 tonnes/ ha. In recent years the total planted acreage is around 2500 ha. of which 68% was harvested in 1986.

There has also been a steady decline in factory performance. From an output of 9967 tonnes of raw sugar in 1979 there was a drop to 6011 tonnes raw sugar in 1986. Since 1981 there have been no exports. The estates also produces a very high quality alcohol and of course, molasses, but the output of these has also dropped significantly, e.g., molasses production has decreased from 5008 tonnes in 1979 to 2715 tonnes in 1986.



The deterioration of the Marienburg Company results directly from the exhaustion of the plantation soils, the inadequate field drainage system, the inefficiency of an outdated factory operation, the absence of a replanting program, the lack of cultivation equipment and the poor condition of the field to factory transport.

Several studies have been made for the Government, relating to the future of sugar in Suriname and three alternatives are being considered:

- a. Complete rehabilitation of field and factory
- b. Partial rehabilitation in three phases
- c. Completely phasing out of sugar in favor of rice or bananas

Alternative "c" is unpopular because it would mean unemployment for most of the 1400 workers and hardship for their families (a total of around 7000 people).



### 3.2.5 Citrus

Some 80% of the planted acreage of about 2000 ha belongs to small producers and about 20% is on large farms - most of the latter being Government owned such as:

Alliance	200 ha in Commewijne
Spiershoek	80 ha in Commewijne
Geyersvliet	116 ha near Paramaribo
Baboenhol	60 ha 80 km South of Paramaribo.

The types of citrus grown are:

Orange	80 %
Grapefruit	15 %
Others (Mandarins, Limes, Lemons, etc.)	5%

Since 1978 total annual production has remained fairly constant at between 11,000 and 12,000 tonnes, despite a fall in acreage from 2033 ha in 1975 to 1755 ha in 1983, resulting from outbreaks of the fatal virus disease "Tristeza" and the sharp increases in production costs - mainly for labour. Since 1983 there has been some increase in acreage and some improvements in cultivation technology. However, the constraints of the disease problems, coupled with soil deficiencies and the lack of rehabilitation of the older plantings, remain. Also there have been little applicable result of research into disease resistant varieties. Yields therefore continue to fall.

TROPICA, a state-owned fruit processing company (which merged with another processor called SUCA in 1982) is the major agroindustrial outlet for citrus from which it produces orange and grapefruit juices in convenient consumer packages.

There is also a very high local consumption of fresh fruit, particularly of oranges, and, due to the bi-modal Suriname climate, the fruit are available year round.

Exports of citrus fruit have been significant in former years, reaching volumes of 20,000 tonnes in 1956 and in 1965 but fell to only 8000 tonnes in 1983 and have been negligible since then. The fruit were exported mainly to Europe, the Netherlands Antilles and French Guyana.



### 3.2.6 Other Crop Production.

Other crop products which are of importance in the sector are vegetables, peanuts, rootcrops (mainly cassava), plantains and coconuts. These crops are grown mainly for the domestic market. The total areas cultivated and the production over the period 1978 - 1986 are shown in ANNEXES III.1.1 and 1.2.

Coconuts: The area under this crop has fluctuated widely over the past two decades from a peak of 1392 ha in 1970 it reportedly dropped to 973 in 1975 and then increased to 1342 ha by 1986. Under the stimulus of a severe shortage of edible oil (due to the closure of the oil palm plantains and the Victoria palm refinery) in 1986 there was the highest ever production - some 8.5 million nuts and the highest ever recorded yield of 8100 nuts per ha. It is estimated that production statistics for 1987 should exceed these figures, since the oil palm industry was closed down for most of that year, and coconut oil prices were extremely high.

Peanuts: Area under peanuts also fluctuated appreciably in the last two decades. After dropping from 326 ha in 1975 to 208 ha in 1980, the area under peanuts expanded steadily up to 627 ha in 1986, most probably due to a 50% reduction in imports in the same year.

Vegetables: The area under vegetables has risen slowly but steadily from 400 ha in 1975 producing about 2200 tonnes to 860 ha in 1985 producing 5600 tonnes. (The aberrant figures for the year 1981 in ANNEX Table are as a result of the census in that year which counted every backyard plot, whereas the regular statistical estimates count only seriously commercial cultivation).





Estimates for 1986 indicate a rise in acreage but a drop in production. This is probably due to shortage and high prices of essential inputs such as seeds, pesticides and fertilizers. Prices in the markets have risen steadily and substantially in recent years as a result of the increasing scarcity of imported processed vegetables.

There is a fair amount of local processing and canning, but no precise figures are available for this. There has also been intermittent exports of fresh vegetables by air to Holland and overland to French Guyana but due to freight problems and the inability of Suriname exporters to compete with other, more regular shippers, exports are now negligible.



### 3.3 THE LIVESTOCK SUBSECTOR

#### 3.3.1 General situation

The livestock subsector of the country is relatively small and fairly intensive, but possesses considerable potential. There has been a steady development during the last decade and the contribution of the subsector to total GDP increased from 19.1% in 1981 to 28.6 in 1986, most of this due to an increase in cattle numbers.

The country is nearly self-sufficient in all livestock products with the exception of milk and dairy products. In 1986, a year in which foreign exchange was practically unavailable for essential imports, Suriname imported 1300 tonnes of powdered milk (value Sfl 3.6 million), 4000 tonnes of cheese and 80 tonnes of butter. The milk went largely to the milk plant for production of reconstituted fluid milk. The cheese and butter met less than 10% of the normal domestic demand for these products.

The bulk of the cattle, pigs, sheep and goats are kept by smallholders. 79% of the chicken and egg production comes from fairly large flocks which are kept around Paramaribo, the remainder coming from the traditional "backyard" production systems.

During the period 1980 - 1986 this sub-sector produced an annual average of Sfl 25 million or 18% of current incomes generated by the sector (Sfl 140 million) as compared with the average from crops - Sfl 71 million or 50%, - and fisheries - Sfl 28 million or 20%.

In real terms its contribution averaged 16% annually as compared with 53% from crops and 19% from fishing. The sector employed 2500 persons in 1986 as compared with 2200 in 1982. Due to the greater local participation and higher incomes retained as compared with the fishing industry, the livestock sub-sector was second to crops as a generator of income and employment.



### 3.3.2 Animal Health

Suriname may be considered fortunately free of the more serious animal diseases that are endemic in other South American and Caribbean countries. A recent epidemiological survey for diseases which sampled 2% of the cattle and 17% of the swine indicated that a variety of minor diseases were present but no single disease was noticeably inhibiting production. In one government experimental beef herd in an interior district there is a focus of Brucellosis and an eradication program has been planned to deal with this. Nutritional problems, screw worm, ticks and internal parasites occur, and the incidence of these is rather higher than normal in recent times because of the shortage of imported concentrate feeds and veterinary medicines. Suriname has recently participated in a study of the Feasibility of Establishing Animal Health and Data Monitoring Systems covering the Caribbean countries (CARICOM) and Suriname. In the course of that exercise, in an attempt to monitor the Government priorities related to improving animal production an Animal Health Data Monitoring System was developed, specifically for Suriname's dairy industry, which included disease and economic parameters (See ANNEX III.3.1). The exercise was aborted by unforeseen problems but it was clear that the Monitor would be of considerable value in protecting and supporting the growth of the livestock sub-sector. For example, it did result in the development of a mastitis control program which, of course, should improve milk production.



### 3.3.3. LIVESTOCK FEEDS AND SUPPLEMENTS

As a rough estimate, cattle, sheep and goats receive about 60% of their requirements from permanent pastures. Poultry and pigs are fed solely on mixed feed or concentrates. About 80%, 18% and 2% of the total mixed feed produced in Suriname is given to poultry, pigs, and cattle, respectively.

There are three livestock feed factories in Suriname. They are private enterprises located in Paramaribo. These firms import maize, soy beans, vitamins and minerals and mix them with broken rice to produce feed with average protein percentages of 19.5% for poultry, 20% for cattle, and 16% for pigs. The imported amounts in 1986 were 32,254 tons maize (valued at Sfl 8,745,646) and 10,905 tons of soy beans (valued at Sfl 4,166,975). In addition, rice bran and oil palm cake and banana export rejects are the main local by-products used directly by the farmers.

The overall requirements of Suriname livestock are not adequately covered, the current situation can be described as:

- (a) poorly managed pasture giving a low quality product
- (b) low grass production during the dry season; and
- (c) cows producing more than 5 liters of milk per day receiving only 2 kg of concentrates daily.

The present average grass production is estimated to be about 30 tons of fresh grass per hectare but, the yield could be significantly increased to 60 tons per hectare or more, through the introduction of improved grasses, proper pasture management including fertilization, the use of a rotational grazing system, and proper infrastructure to control waterlogging problems in the rainy season.





### 3.3.4. CATTLE

#### 3.3.4.1. GENERAL

The cattle herds are estimated around 66 900 head in 1986, of which 67% (44 700 head) are dairy animals. The cattle herds are concentrated in the Middle Region where 76.0% of the total cattle are kept due to the proximity of the only milk plant in the country, as well as suitable marketing infrastructure.

The local cattle, which are used both for meat and milk production, are a mixture of Criollo, Zebu and Holstein-Frisian, in addition to a small amount of other blood such as Sahiwal and Jersey. About 67% of the cattle are used for milk production and about 33% for beef production. The overall fertility rate is roughly estimated to be 65%, adult mortality is about 2%, and the calf mortality rate is estimated to be around 10%. The total area of grassland in Suriname amounted to about 21,000 ha in 1981 as shown in ANNEX III.3.2. These grasslands are owned or rented, are individually managed, and are concentrated in the Central Region near the capital city.

About 85 percent of the grasslands are fenced and are primarily used to raise cattle. Most of the pasture land consists of natural grasses, and due to their low production and high stocking rates, farmers are using concentrates, if available, as supplementary feed. The chronic shortage and periodical unavailability of concentrates is a major problem. Permanent pasture production depends completely on rainfall. Livestock are raised mainly on small farms of less than 5 ha and medium size farms of 5 - 20 ha as shown in ANNEX III.3. . Herds of less than five cattle account for 57.7 percent of the local number of cattle.



### 3.3.4.2. MILK PRODUCTION AND MARKETING

Suriname has inherited from Holland a sound basic tradition in dairying and possesses a good national herd of dairy type animals. However milk production was based, through the years, on imported concentrated feeds, and the potential for production based on grass was never seriously explored.

The total dairy production has increased from 7.2 million litres in 1981 (of which 4.4 million litres were delivered to the milk plant) to 12.0 million litres in 1986. Milk production is generally low due to: low yield per cow, short lactation periods, late first calving (at an age of 3 to 4 years), high calf mortality rate (estimated at 20%) and poor management.

The Government decides the milk prices in consultation with the Dairy Farmer's Union. Raw milk is sold to the milk plant, a parastatal company located in Paramaribo. Suriname has no collection or concentration centres. The farmers have no cooling facilities.

63% of the milk is collected by private collectors who pay the farmers from 10 to 15 cents per litre below the factory price of 90 cents.

33% of the milk is collected by the Milk Plant which pays the farmers 85 cents per litre.

4% of the milk is delivered to the Plant directly by the producing farmers who receive the full price of 90 cents per litre.



## MILK PRODUCTION AND MILK PLANT RECEIPTS

YEAR	ESTIMATED TOTAL PRODUCTION (000)	RECEIVED BY MCP (INCLUDING LOSSES) (000 LTRS)
1962	7800	5055
1963	7600	5010
1964	8700	5494
1965	8914	6385
1966	10406	6913
1967	10083	6420
1968	9535	6450
1969	8750	5725
1970	8008	5505
1971	6864	4426
1972	6556	4048
1973	5664	3471
1974	7280	2900
1975	7560	3043
1976	8100	3152
1977	7830	3399
1978	7790	2957
1979	6892	2226
1980	7106	2661
1981	7200	4389
1982	8300	4868
1983	8700	5474
1984	9000	6172
1985	10000	6304
1986	11000	6078
1987	12500	4289 *

Source: Ministry of Agriculture and IICA estimates  
 \* Dropped due to suppliers strike and increased outside sales.



The annual growth of milk production (Table 3.3.4.2) shows an increase since 1981, but the delivery to the Milk Plant is rather constant since 1983. It is estimated that out of a production of 12.0 million litres produced in 1986, 5.9 million litres (49%) went into illegal sales, family consumption and was fed to calves. The remaining 6.1 m. litres were collected by the M.C.P. and were processed to fluid milk after being mixed with powdered milk, as well as to dairy products (see ANNEX III.3.7). The full processing capacity of the M.C.P. is 60,000 litres pasteurized milk per day, which is not sufficient to satisfy the domestic demand. The Milk Plant estimates that even with an increase of their pasteurized milk by a further 50% using the much cheaper milk powder, their current production costs (distribution costs are not included) will average Sfl 0.94 per litre.

The subsidy, estimated to be more than 50 cents/litre, benefits mainly the urban consumer, and constitutes a major obstacle to the rationalization of the dairy industry policies. The size of the subsidy and the problem that the Government is continually facing in finding, not only the financing to maintain the milk plant operation, but also the necessary foreign exchange to purchase whole milk powder and other imports, result in a constant cash flow difficulty for the plant and a severe drain on Government resources.





### 3.3.4.3. BEEF PRODUCTION AND MARKETING

Most of the beef produced in Suriname is what appears as an unplanned by-product on the dairy farms. This means that most of this off-take is composed of culled cows - usually quite old - and surplus bulls.

There are five relatively small specialist beef producing farms that use improved pastures but without a sophisticated fattening regimen. The average carcass weight and the total beef production has changed very little from 160 kg and 1298 tons in 1981 to 165 kg and 1256 tons in 1986, respectively.

Beef production costs are very difficult to obtain in Suriname. Farm gate prices are periodically published by the Ministry of Agriculture. These prices are not specific and there is no premium for quality as there is no grading system. The Ministry of Econ. Affairs sets the beef prices but these guidelines are often disregarded by the middleman and butchers, the actual prices following the laws of supply and demand.

There are three slaughterhouses owned by the government, located in Paramaribo, Nickerie and Coronie. The slaughterhouse in Paramaribo has separate cattle rooms. About 25 to 30 cattle are slaughtered per day, in addition to home slaughtering which amounts to about 10%. The slaughtering take place five days per week. Cattle are slaughtered by individual butchers using cradles and hoists. The beef chiller has a storage capacity to 30 to 35 carcasses and the butcher has free storage for one day. The slaughtering costs are nine cents per kilo and the storage costs after one day are 5 cents per kilo. The amount of imported beef has decreased from 1 378.5 tons in 1981 to 920.6 tons in 1986. The per capita consumption of beef was about 5.48 kg per year.



#### 3.3.4.4. BREED IMPROVEMENT

Most cattle farmers run their own selected or purchased bulls with the herd and very little attention is pay to genetic improvement.

The artificial insemination service started in 1952 at the Reeberg State Farm near Paramaribo using fresh and frozen Frisian semen to upgrade the dairy cattle. About 186 inseminations were done in 1952 and the number increased to about 6000 in 1985 which is the top ever reached in Suriname. Due to relatively low milk prices, however, most dairy farmers switched to beef production, and accordingly, the number of inseminations dropped to about 1721 in 1981 with a slight increase since then, until it reached 2081 in 1986. Most artificial inseminations are now performed in the Middle Region and farmers are paying Sfl.10.0 per insemination.

The services are, however, inadequate, due primarily to transportation problems. An EEC project is to improve the artificial insemination service in Suriname through the supply of frozen semen, training of technicians, provision of transportation facilities and equipment and construction.

#### 3.3.5. PORK PRODUCTION AND MARKETING

Pork is produced on 630 farms and the pig population in 1986 was composed of some

2900 breeding sows

660 breeding boars and

15,200 fatteners.

The industry is very heterogeneous in terms of size and system, with 42% of the producers having less than 5 pigs and another 22% having less than 10 and only 5% keeping over 100 animals.

The pigs are mostly of an undefinable mixture of European breeds - mainly Landrace, Yorkshire and Duroc.



Average litter weaned is around 8 piglets and average carcass weight is 67.5 kg. The production system, is based on imported concentrates, mainly, but producers also use swill, bananas and some rice bran and broken rice and wheat bran.

The feed used for pork production has a protein content of 17% and contains 30% imported concentrates mixed with other ingredients such as rice bran, white rice, maize and wheat bran. Feed consumption is approximately 3.0 kg/day/pig and the conversion rate is estimated to be around 3.7/1

In 1986, 19 000 pigs were slaughtered with a total carcass weight of 1354 tons. Since 1981, when only 14,697 pigs were slaughtered - weighing 1102 tons - production has increased by 23%. The farm gate price was Sfl 3.00 per kg during the period 1981 to 1983 and this was increased to Sfl 5.00 in 1986. Pig slaughtering is undertaken at the government slaughter houses described above. Imported pork products have decreased significantly from 111.2 tons in 1981 to 1.1 tons in 1986. A fair quantity of pork is locally processed into sausage and other products, but the exact quantities are not recorded at the present time.

### 3.3.6. SHEEP AND GOAT PRODUCTION

The national small ruminant herd was estimated at 9972 in 1986 of which sheep and goats amounted to 4024 (41%) and 5768 (59%), respectively. The sheep and goat population exists mostly in herds of 5 to 8 animals and their regional distribution shows that they are concentrated in the Middle Region of the country where cattle production is established. Raising of small ruminants is seen in Suriname as a joint activity to that of cattle production.



Goats and Sheep have long been kept in Suriname for meat production and it is generally held that the introduction of small ruminants from Africa to the Caribbean was associated with the slave trade. The Government has imported sheep from Barbados and goats from Curacao over the years. However, no sustained efforts have been made to maintain these animals as pure breeds. Hence, the resultant native herd of sheep and goats can be described as a heterogeneous group of small-to-medium sized animals that vary in color with some individuals showing color markings characteristic of the imported breeds. This native herd, especially the sheep, is quite hardy and prolific and some of the animals reach a fairly large size.

Goats and Sheep raising is unorganized. They are kept mainly as a ready source of cash or for the provision of meat for special occasions. Groups of 3 to 5 animals are tethered along the roadside for grazing, and the larger herds are reared under an extensive system where sheep are allowed to graze during the day. Some farmers supplement grazing with bananas and rice bran.

Production costs are very difficult to obtain in Suriname, but generally speaking, sheep and goat production has lower feeding costs and requires less labour as compared to that of other livestock. The financial return seems to be improving gradually since the price of mutton and goat meat is increasing relative to other meats. There has never been an import of sheep or goat meat to Suriname, and the per capita consumption of small ruminant meat cannot be accurately estimated because the bulk of the animals are slaughtered in backyards.





### 3.3.7. POULTRY PRODUCTION

Suriname, like most countries of the Caribbean and Latin America has adopted in large measure the assembly line technology of broiler production and egg production with all the usual components: specialized breeds, high quality concentrate feeds, standardized sanitation and veterinary practices and intensive rearing and marketing. Since Suriname does not produce a wide variety of inexpensive feeding stuffs and does not have the genetic resources and the technology to produce more than a fraction of its own stock of broilers and layers, a large fraction of the feed ingredients and most of the hatching eggs are imported.

About 1.0 million hatching eggs are produced locally and about 8.0 million are imported annually.

Average annual production of poultry meat was in excess of 10.000 tonnes in 1985 and 1986. Egg production dropped from 61.8 million in 1985 to 44.4 million in 1986. With respect to production systems it should be pointed out, that, inspite of what is said above, that about 21% of the chickens and eggs are produced in the "traditional" backyard production system which is found throughout the rural areas. The intensive production systems are found mainly in the Middle Region, i.e., around Paramaribo.



### 3.4 INSTITUTIONAL SERVICES IN THE AGRICULTURAL SECTOR

#### 3.4.1 MINISTRY OF AGRICULTURE, ANIMAL HUSBANDRY AND FISHERIES

The Ministry of Agriculture, Animal Husbandry and Fisheries is the core institution of the public agricultural sector, and has the responsibility for devising and implementing policy measures and regulations to stimulate and encourage the socio-economic well-being and development of the farming population. In addition it carries out certain technical functions:

- Agricultural Research
- Rural Extension
- Development of Rural Cooperatives
- Development and Maintenance of the Agricultural Production Infrastructure
- Acquisition and Distribution of Essential Production Inputs
- Seed and Plant Production
- Livestock Breeding  
(including Artificial Insemination)
- Staff In-service Training

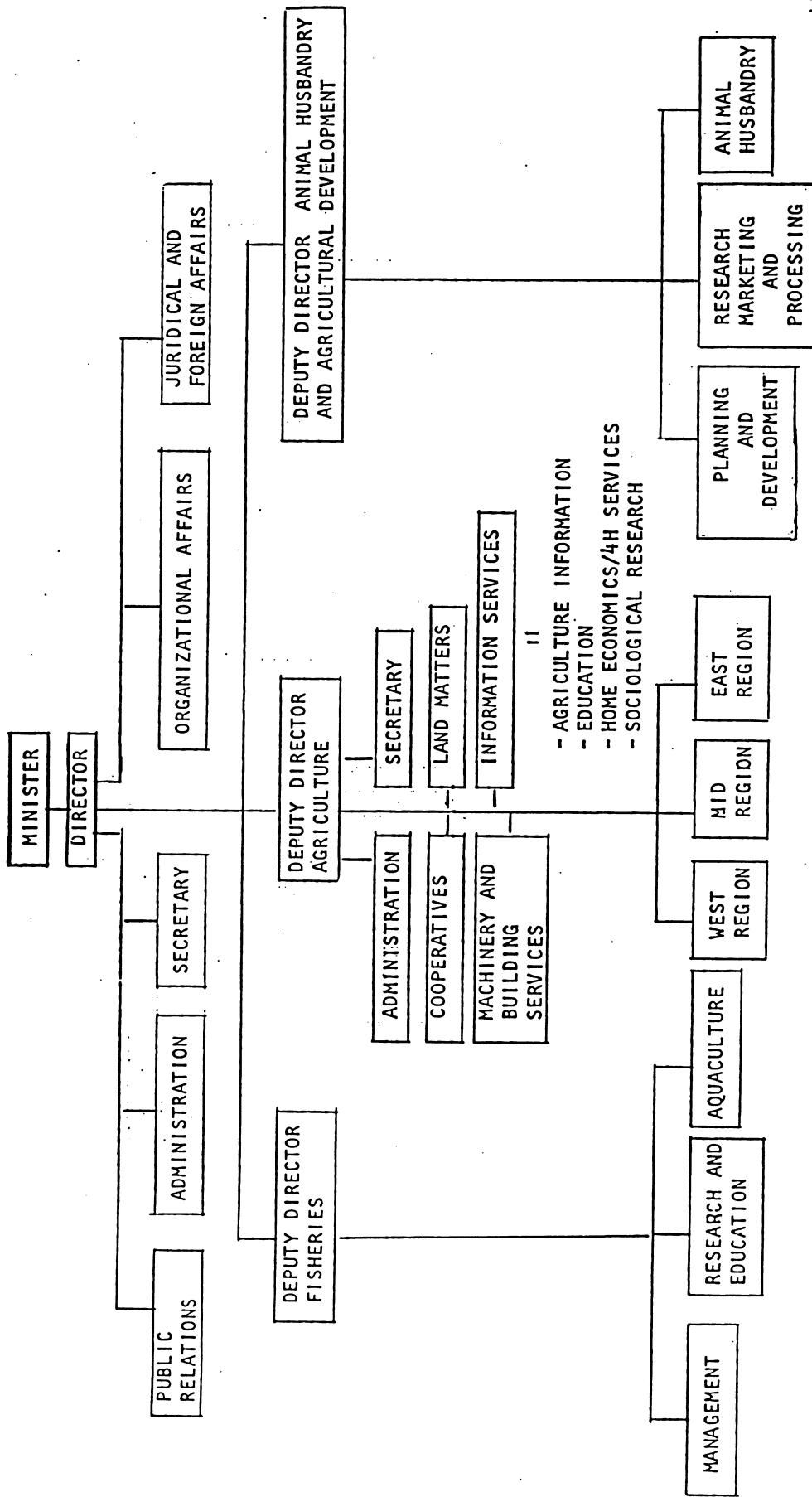
The Ministry is divided into three Specialist Divisions (see Chart 3.4.1)

- Agriculture
- Animal Husbandry and Agricultural Development
- Fisheries



CHART 3.4.1

INSTITUTIONAL STRUCTURE: MINISTRY OF AGRICULTURE, LIVESTOCK AND FISHERIES



Source: The Ministry of Agriculture



TABLE 3.4.1

Number and Qualifications of Personnel working with the  
Ministry of Agriculture, Husbandry and Fisheries (1987)

	Primary School	Secondary School		High Education		TOTAL
		Junior	Senior	Technical Diploma or B.Sc.	M.Sc.	
1. Minister						
2. Director						
3. Directorate of Animal Husb. + Agri. Development						
I Planning & Devel.	4	10	8	2	5	29
II Research, Marketing + Processing +	294	58	35	15	4	406
Palm Research	9	1	2	1	1	14
III Animal Husbandry	75	12	32	5	6	130
SUB-TOTAL	382	81	77	23	16	579
4. Directorate of Agriculture						
I Administration	9	8	5	2		24
II Cooperatives		4	3		1	8
III Land Affairs		1		1		2
IV Information Service	1	2	5	2	2	12
V Mechanical + Building Service	32	6		1		39
VI West Region	93	34	12	3		142
VII Mid Region	173	62	29	9		273
VIII East Region	83	27	6	2	2	120
SUB-TOTAL	391	144	60	20	5	620
5. Directorate of Fisheries						
I Research and Statistics	20	13	7	3	1	44
II Administration	21	9	1			31
SUB-TOTAL	41	22	8	3	1	75
6. Personnel, Public Relations and Administration						
I Administration	33	49	10	5	2	99
II Public Relation	4	5	5			14
III Organizational Affairs	2	2	2			6
IV Juridical and Foreign Affairs			2		2	4
SUB-TOTAL	39	56	19	5	4	123
TOTAL	853	303	164	51	26	1397

Source: Suriname Agricultural Sector Study IDB 1987





3.4.1.1 The Division of Agriculture is the largest of the three. It employs 620 persons of which 25 are University or Technical Institute graduates. It has three regional divisions - West, Middle and East - each of which is directed by a Regional Coordinator. Each region is divided into Districts or Ressorts, each of which has a Ressort leader. To each District or Ressort office is attached the Extension, Animal Health, Economics and Statistics field workers.

The Division is also responsible for:

- Cooperative Development
- Information Services
- Land matters
- Machinery and Buildings

3.4.1.2 The Division of Animal Husbandry and Agriculture Development is the second largest division, employing around 576 persons of whom 36 are University or Technical Institute graduates.

This division is further divided into the following Sub-divisions:

- i Animal Husbandry
- ii Planning and Development
- iii Research Marketing and food Processing  
(see chart 3.4.1.2)

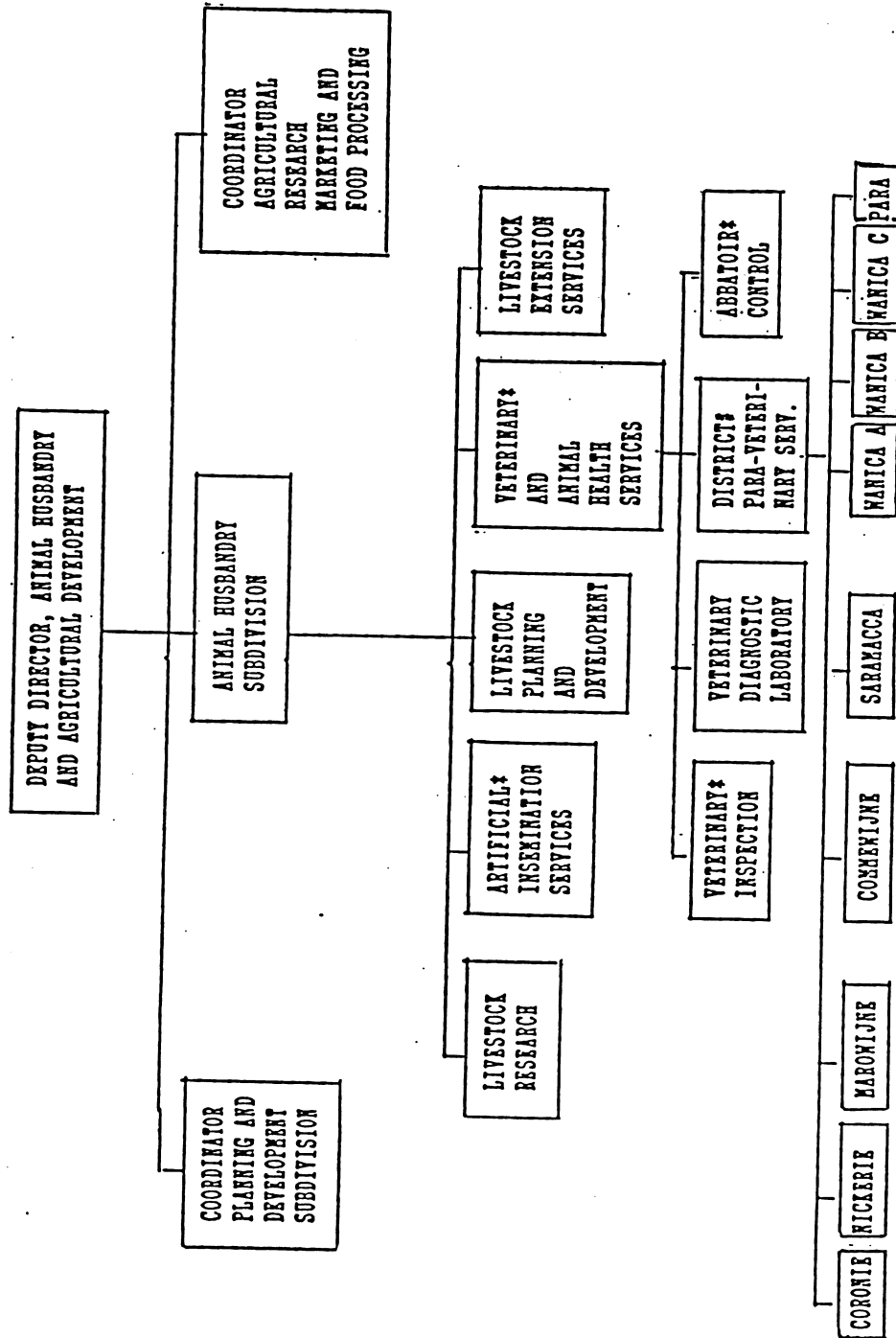
The Sub-division of Animal Husbandry is responsible for:

- a. Livestock Research
- b. Livestock Extension
- c. Artificial Insemination
- d. Planning and Development of the Livestock Subsector
- e. Veterinary Services



CHART 3.4.1.2

STRUCTURE OF ANIMAL HUSBANDRY SUBDIVISION OF THE MINISTRY OF AGRICULTURE



\* Headed by Veterinarian    § Animal Health Assistants.



However, of these five functions, the only ones that are well developed are the (e) Veterinary Services and (c) the Artificial Insemination Service. There are four veterinarians, all resident in Paramaribo who serve only the livestock farmers of the Middle Region on request and in emergencies and there are nine (9) Animal Health Assistants, para-veterinary technicians, who are stationed in the various Districts.

In recent years veterinary drugs and medicines have been in critically short supply and have been supplied to farmers mainly through the Vets and the AHA's. The sub-division is also responsible for enforcing the regulations governing the slaughter and disposal of animals, and diagnostic laboratory services.

(a) There is no organized Research program for livestock nor for related fields within the Ministry. When the beef animals were transferred from the Reeberg State Farm it was then proposed that research into milk production, animal nutrition, farm management and pastures would be developed there, and in addition to set up a pilot dairy farm and develop a model farm herd. Unfortunately none of these ambitions have been realised and the State Farm has relapsed into a not-too-efficient dairy farm, employing more staff than it can afford and occupying much more land than it needs. The dairy herd there now consists of over 70 cows and over 20 heifers, 5 breeding bulls and 6-7 bull calves.

(b) There is no organized Livestock Extension service. Although there are a few staff in the Division who are called "Extension Officers", few have had training in animal husbandry and their educational background is poor. A few of the regular Extensionists carry out a limited livestock program in some Ressorts largely on their own initiative. Such livestock extension as is performed is carried out in an ad hoc fashion by the Animal Health Assistants as they pursue their regular duties.



(c) The A.I. service is being rejuvenated under a new comprehensive project being financed by the European Economic Community Lome funds. Up to now the A.I. service has operated out of the State Livestock Farm at Reeberg. In the early years both fresh and frozen semen was used but more recently - and from now on - imported frozen semen is preferred. A detailed description of the new A.I. service under development is given at ANNEX III 4.1. This project was approved in 1986 and will provide imported frozen semen, training, vehicles for the inseminators and a small liquid nitrogen plant at the new A.I. center to be constructed in Paramaribo.

#### 3.4.1.3 The Fisheries Division

This division contains three sub-divisions:

- Management
- Research, Statistics and Extension
- Aquaculture

but experience indicates that the sea fishery, which includes the lucrative off-shore shrimping and fishing, receives the greatest share of attention with the artisanal fishery running a distant second.





### 3.4.2 Agricultural Credit

#### 3.4.2.1 General

Access to farm credit in Suriname is directly related, to size of the enterprise and its asset position. Large scale farmers who own all or part of the assets of their business, and agro-industry, have ready access to commercial bank credit and to financing by the National Development Bank (NDB). The main commercial banks are De Surinaamsche Bank (DSB), the Hakrin Bank and the Algemene Bank Nederland (ABN). The Government owns three smaller banks of which the Agriculture Bank is the largest. Small farmers who have little or no assets to mortgage but who have a viable farm business have access to Agricultural Bank credits.

However, even though the Agricultural bank is the specialised institution, only 14% of the credits extended to the sector over the period 1981 - 86 came from that source. The bulk of the remaining 86% came from the two nationally owned (or part-owned) banks DSB and the Hakrin bank. The explanation of this phenomenon is, of course, that while the Agriculture Bank may have made the greater number of loans, these were on the average, relatively small, while the others made fewer but very much larger loans.



### 3.4.2.2 THE AGRICULTURAL BANK

#### (i) General

The Agricultural Bank was established in 1972 as a necessary institutional successor to the Agricultural and Fisheries Fund, which, from 1957 to 1972, was the small farmers only organized source of credit.

The Bank, which is fully owned by the Government, has a share capital of Sfl 10.0 million of which Sfl 5.0 million is fully paid up in Sfl 1.0 million preference and Sfl 4.0 million ordinary shares.

The Bank falls within the portfolios of both the Minister of Agriculture, Livestock and Fisheries and the Minister of Finance, and the Board of Directors and the Managing Director are appointed by the Government on the recommendation of both Ministers.

The articles of association of the Bank defines its functions as follows: ".....to carry on the business of a bank in the widest sense of the word, particularly to stimulate the development of Agriculture, Animal Husbandry, Fisheries and Forestry in Suriname."

The Bank, therefore, has a dual role: its primary function of financial support and stimulant for the development of the Agricultural Sector - its development function, and a secondary function of providing the ordinary general banking services to its clients.



(ii) Institutional Structure.

The Bank is managed by a Director, a Deputy Director and the Heads of the following Divisions:

- Finance
- Accounting
- Internal Control
- Planning
- Nw Nickerie and Coronie
- Cash Management
- General Administration and Personnel

In addition to its Head Office in Paramaribo there are seven branch offices in population centres of rural districts as follows:

- Nieuw-Nickerie in the Nickerie District Totness in the Coronie District
- Kwatta and
- Lelydorp in the Wanica District
- Tamanredjo in the Commewijne District Groningen in the Saramacca District

The Groningen office does business once a week out of rented premises while the other branches are open every working day. The Kwatta branch is sometimes open on Sundays for the convenience of the district farmers.

(iii) Credit Policy

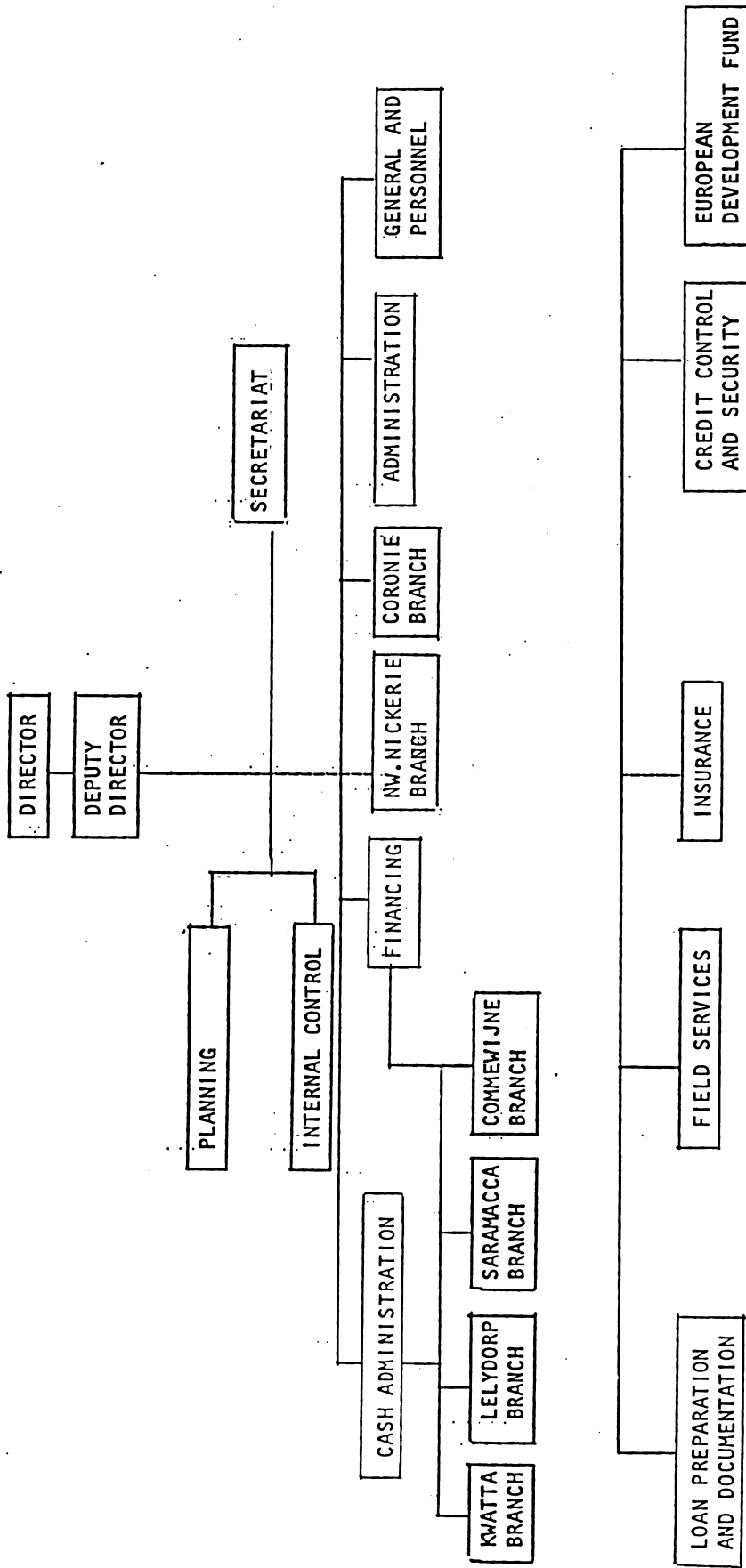
The Bank's credit policy is simple and straightforward: financing facilities must be made readily available for viable production activities in Agriculture, Animal Husbandry, Fisheries and Forestry, particularly to small producers who - for one reason or another - cannot obtain commercial credit.

Interest rates are low, 8% - 9%, depending on the farmers net worth, and partial security is accepted such as leased land and where farmers cannot put up their own capital for investment.



CHART 3.4.2.2

ORGANIZATIONAL CHART OF THE SURINAME AGRICULTURAL BANK







Grace periods are granted adjusted to the enterprise cash flow and where there are unforeseen production set-backs.

In addition the farmers are given free advice and assistance in preparing their loan applications and enterprise budgets and in consultation with the Extension Service of the Ministry of Agriculture farmers are afforded guidance in their production planning.

The Bank supports farm cooperatives which desire to make bulk purchases of essential production inputs or to initiate collective marketing of their products.

The Bank also finances or participates in the financing of general agricultural development projects, for example, for the provision of infrastructure or the creation of model demonstration farms.

(iv) General Investment in Development

The Bank participates in the share capital of public Sector businesses which are formed to support and implement national economic development, e.g., the Suriname Cardboard Manufacturing Company and the Suriname State Oil Company.

It also supports applied research efforts which are designed to increase production, production efficiencies, marketing and promotional events in the agricultural sector such as seminars, conferences, exhibitions and fairs.



(v) Resources

The Bank's resources in recent years have come from several sources. Between 1978 and 1981 the bank received some Sfl 31.6 million out of the Dutch Development Aid package granted to Suriname at the time of Independence.

More recently the European Development Fund (EDF) has been the main source of special funds under two credit lines Sfl 4.2 million in 1980 and Sfl 12 million in 1984. The EDF credit lines are advanced at an interest of 1% for thirty years with a grace period of ten years.

Government loans have also been made to the bank out of the repayments of the original "Dutch Aid" credits. In 1983-84 some Sfl 5.9 million was thus recycled with an interest rate of 4%.

The bank also uses savings and deposits which accrue out of its general banking services, which is lent out as ordinary commercial credit at a minimum interest rate of 9%.



(vi) Evolution of the Agricultural Bank

The Agricultural Bank has shown a positive growth since its establishment. The total balance and the outstanding loans from 1972 to 1986 are as follows:

<u>Year</u>	<u>Total Balance</u>	<u>Outstanding Loans</u>	<u>Number of Loans</u>
1972	1 895 000	818	484
1973	4 497 000	2 243	715
1977	16 003 000	8 868	1 895
1982	76 416 000	41 207	4 609
1986	143 224 000	65 763	7 925

These figures show that the total balance in the first five years of the Bank's existence grew from Sfl 1.8 million (1972) to Sfl 16.0 million (1977), which is a 788.9 percent growth. In the following five years (to 1982) there was a 378 percent growth. Even after 1982 the total balance showed a steady increase each year and it presently showed an amount of Sfl 149.2 million. The amount of the outstanding loans in 1977 showed an increase of 300 percent compared with 1973. 1982 showed a 368.2 percent increase in comparison with 1977. After 1982, this relatively high increase continued and at present the Bank has 8,739 outstanding loans, totaling Sf 68.3 million.

In various other balance sheet components, the development growth throughout the 15 years can be observed. It should be noted that the figures for some of these components were not kept precisely, so that the amounts concerned have not been included in the following overview.



## Amount (X Sf 1 000)

	1972	1973	1977	1982	1986
Debit balance in					
current account #	--	--	3 551	19 336	41 123
Reserves	127	486	1 181	3 151	5 212
Terms deposits #	--	--	3 491	46 018	48 989
Savings	--	348	3 313	9 934	36 070

-----  
 # The exact figures for the debt balance in current account have been kept since 1974. In 1974 the amount was Sf1 550,000. The exact figure for term deposits in 1975 was Sf1 82 000. Since 1977 the balance for NHAS loans and, since 1981, for the EDF loans as well, have been included in the term deposits.

The development can be measured from the number of accounts, as follows:

	<u>Number</u>				
	1972	1973	1977	1982	1986
Term deposits	--	--	48	180	241
Savings accounts	--	294	2645	7372	10918
Current account					
with credit	--	--	677	1160	1288
without credit	--	168	1323	3992	6667

With respect to the overviews given above, it may also be noted that the number of term deposits (including loans) at present is 242 totalling Sf1 48,5 million. The number of savings accounts is 10,749 totalling Sf1 35,3 million. The term deposits and savings accounts both show a small decrease compared with 1986 year end.





### 3.4.3 MILK MARKETING

By law, the Milk Processing Company (Melkcentrale N.V.) is the sole authority for the purchase of raw milk and the distribution of processed milk. But problems arising from defects in the collection system, and the pricing system, and from the insufficiency of milk supplies in the face of existing demand, have given rise to several distortions in the marketing of the domestic milk supply. (See ANNEX III.4.3)

#### 3.4.3.1 THE MELKCENTRALE N.V.

The milk processing plant was established by the Government as a limited liability company in 1959 and all shares are owned by the Government except for one which is held by the National Planning Office (Stichting Plan Bureau Suriname).

It is managed by a Government appointed Director and three Department Heads.

It has a total processing capacity of 60 000 litres of milk per day but currently purchases between 13 000 and 14 000 litres of raw milk per day.

Its daily output of 40 000 litres of pasteurized milk is achieved by supplementing its production line with reconstituted full cream powdered milk which is imported from Holland.

Until a few years ago, it also produced about 10 000 litres of flavoured milks, cream, butter and yogurt, but these items are now made only occasionally and in relatively small quantities.

The plant is in poor repair and in need of modernization. Proposals were put up in 1986 to change to the production of U.H.T. milk, but this is not expected to materialize for several years.



The Milk Plant's services to farmers are limited to those related to milk collection. It imports the milk churns, collects milk in the main production areas, cleans and sterilizes the churns and returns them to the farmers.

At the present time, the Milk Plant is operating well below its original processing capacity of 60 000 litres per day. Much of the machinery in its production line and vital equipment such as the in-line cooling tanks is in very poor condition.

This situation results from two severe burdens which have combined to destroy the Milk Plants ability to effect proper maintenance and schedule essential plant replacements over the past several years. One burden, common to all industrial concerns in Suriname, is the chronic shortage of foreign exchange. The other, is the problem of the huge animal subsidy which the plant must absorb as a result of the differential between the controlled prices for raw milk and pasteurized milk.

The milk plant augments its production by reconstituting full cream milk powder. While this reduces its operating loss per litre of pasteurized milk, the import of milk powder is a further drain on foreign exchange amounting to Sfl 4-5 million annually.

#### 3.4.3.2 COLLECTION METHODS

At the present time there are three modes of collection of milk distributed as follows:

63% is collected by Private Collectors

33% is collected directly from farmers (about 200)  
(by special contractors to the milk plant).

4% is delivered to the Plant by farmers



The milk is collected in 30 litre milk cans on the open tray of a pick-up or truck or in the back of a van.

Private collectors buy the milk from the farmers and bulk small amounts in their own cans to sell to the Plant. For this service they exact a margin of Suriname guilders 0.10 to 0.15.

Collection is once per day, beginning in the early morning, so that farmers who milk twice a day cool the evening milk in a cooler or refrigerator, or in some cases, scald it and mix it with the next mornings milk.

Payments are made fortnightly.

#### 3.4.3.3 GRADING AND/OR QUALITY CONTROL

There is no grading for milk but, at the milk plant minimum tests are applied to each can of milk before it enters the processing line for solids-not-fat (water content) and for minimum butter fat content. The lack of grading and the absence of any premium for quality is an involuntary discrimination against those efficient farmers who daily supply appreciable quantities of milk.

#### 3.4.3.4 INFORMAL MARKETING

As a result of the chronic milk shortage, both of imported powdered and condensed milks and of local fluid milk, many dairy farmers have, for several years now, been selling directly to consumers at prices varying from SF1 1.00 to 1.50. It is estimated that some 54% of the milk produced in the districts around Paramaribo is disposed of in this way.



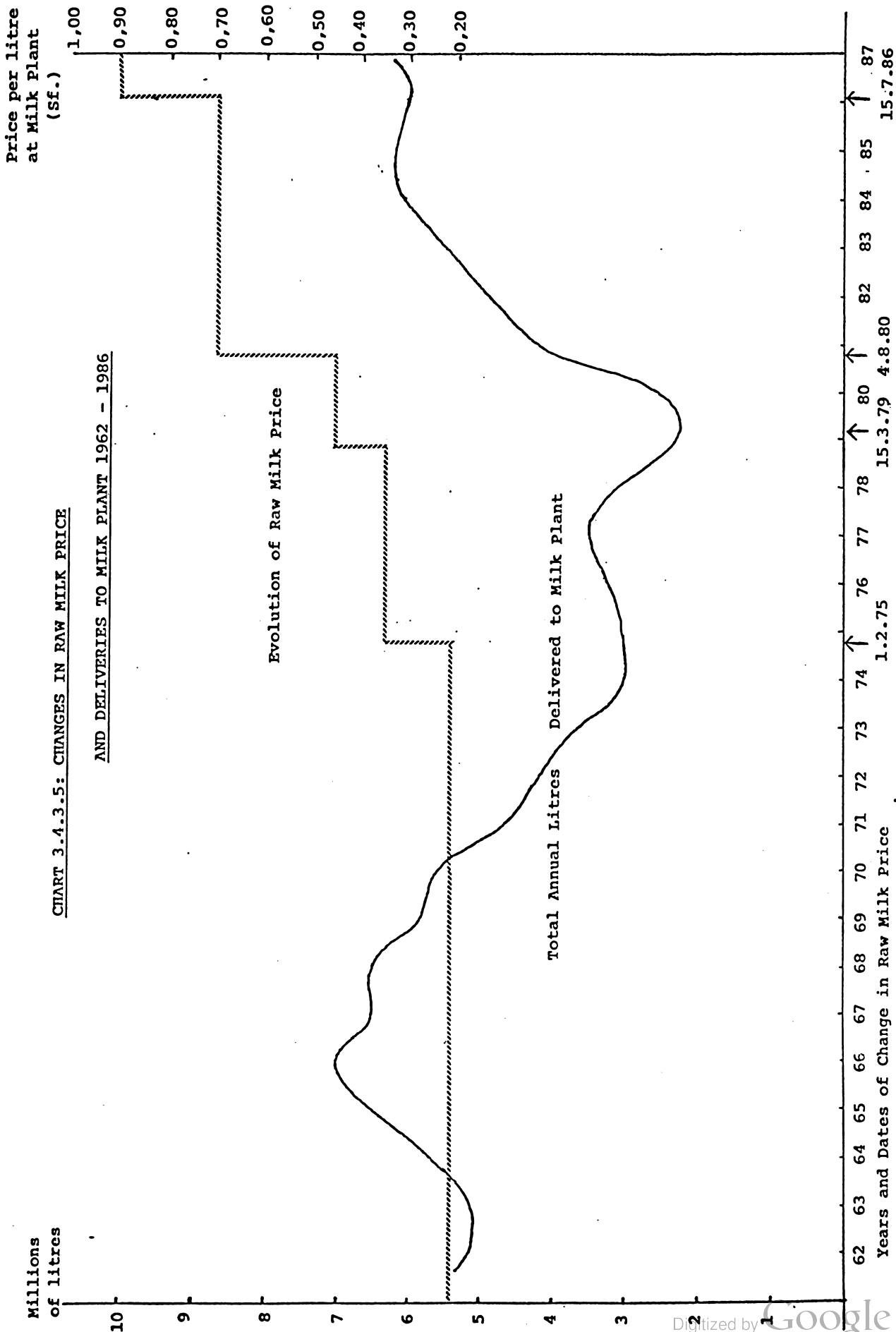
#### 3.4.3.5 MILK PRICES AND THE SUPPLY OF RAW MILK

Milk prices, both payments to the farmer and price to the consumer are controlled by law since the establishment of the milk plant in 1959. At that time, the guaranteed price of Sf 0.20 per litre boosted domestic milk production (as gauged by deliveries to the milk plant) to over 10.4 million litres in 1966. However this price was not subjected to periodic review to ensure its continued validity. It was in fact maintained for sixteen years! Milk production dropped to 5.7 million litres in 1973 and in 1974 the milk plant received less than 3 million litres. Since 1975, when began a series of price changes leading up to the present Sf1 0.90/litre, there has been a steady rise in total production up to an estimated 12.5 million litres in 1987 (See Chart 3.4.3 and annex III.3.7)





CHART 3.4.3.5: CHANGES IN RAW MILK PRICE  
AND DELIVERIES TO MILK PLANT 1962 - 1986





#### 3.4.4 THE DAIRY FARMERS UNION

This is a cooperative which represents over 5000 milk producers most of which are small holders. The organization was started in 1977 under the stimulus of a surplus of fluid milk and low prices, and evolved over a period of years into the main bargaining body for dairy farmers.

Of their membership, roughly 4000 are farmers who occupy from 0.5 to 5.0 ha of land producing about 7000 l. per day and over 1000 are farmers who have holdings in excess of 5.0 ha and produce over 5000 l. per day.

The Union plans to establish twelve (12) district branches and a formal financial structure which would allow it to employ its own technicians and veterinary personnel and to purchase in bulk and distribute to its members essential production input and equipment at reasonable prices.

The organization has also recently applied through the Ministry of Agriculture for a soft loan from the Small Projects Division of the Inter American Development Bank to finance the establishment of one or two farmer Service Centers in areas in which there is a concentration of dairy farmers.

At this time these plans are still in the gestation phase and it may be said, that, whole the Union has not included assistance for organization and management in its requests to the Government and IDB, that this kind of guidance is probably most urgently required.



### 3.5 Rural Population, Employment and Incomes

As may be seen from ANNEX III.3.2, 93% of the farms recorded in the 1981 census occupy holdings of less than 10 ha and control only 33% of the cultivated land. The remaining 7% who occupy holdings over 10 ha in size are large farmers, private companies and government estates. The small farm enterprise is therefore crucially important in relation to employment and incomes of the rural population.

The published statistics on employment in the agricultural sector are seriously qualified because they exclude immigrant labour, which in recent years has grown substantially, mainly Guyanese and Haitian. These immigrant workers are found mainly on the plantations in rice, bananas, oil palm and sugar. It has been estimated that immigrant labour amounts to 20%, at least, of all agricultural labour. Nevertheless, for what they are worth the official employment figures for the sector are given in Table 3.5 below.

Table 3.5

Employment in Agricultural Sector 1975-1985\*  
(\*Immigrant workers excluded)

Year	No. Positions	Sectoral Share	Year	No. Positions	Sectoral Share
1975	15300	16.7%	1981	14040	14.2%
1976	14700	15.7%	1982	13950	13.6%
1977	14500	14.7%	1983	13860	13.6%
1978	14200	13.9%	1984	13770	13.8%
1979	13900	13.6%	1985	13570	13.6%
1980	13900	14.1%	1986	13320	13.9%

Source: Bureau of Statistics/ Planning Office



Even allowing for the omission in the table, of immigrant workers, it shows a decline in employment in a period when agricultural output was increasing. There would be a combination of reasons for this: the substantial increase in employment in the public sector of individuals who continued farming on a part-time basis, a steady immigration of individuals to Holland and, in smaller numbers, to French Guyana; and the fact that much of the growth in output took place in the rice industry which is not labour intensive in Suriname. In terms of income, however, the fact is that in relative terms, incomes in agriculture have fallen sharply during the period under review, so that in 1986 a worker in the bauxite industry earned about Sfl.41,000 - more than ten times the income of the average worker in agriculture. This low return has been buffered to a large extent by three conditions:

- multiple incomes in the farm family
- greater use of unpaid family labour
- substantial increase in part-time employment in other sectors.

### 3.6 The Fishery Sub-Sector

The fishery sub-sector may be divided into the artisanal fishing in which small individual operators exploit the fresh and brackish waters and the sea along the coast, and the deep sea fishing which exploits the shrimp and fish resources of the continental shelf.

The artisanal fisherman sells most of his catch in the domestic markets while the shrimps and deepsea fish catch is mostly exported to Japan, the Netherlands and the USA.

The deepsea fishing is, of course, highly capitalized and in the hands of fairly large companies: Suriname-American Industries Ltd (SAIL) and Suriname-Japan Fishing Co. (SUJAFI). SAIL is owned by the Suriname Government while SUJAFI is owned jointly by Surinamese and Japanese nationals. Each operates a processing plant and between them and their subsidiaries operate about 160 trawlers which are manned mostly by Korean or Guyanese fishing crews.





Government owns another fish processing plant Stichting Visserij Bevordering (STIVI), which buys, processes and retails and exports the fish catch of around 120 artisanal fishermen.

The shrimp and, to a much lesser extent the deep sea fish catch, are important earners of foreign exchange, though a distant second to rice in the sector. Peak values of about Sfl.74.0 million were recorded in 1981 and 1982 which then dropped sharply in 1984 to Sfl.44.0 million when three Korean companies closed down and left Suriname due to decreasing yields and increased exploitation costs.

But in 1986 there was a recovery due to increases in export prices which continued through 1987 (See ANNEXES .II.2.1 and III.1.5)

While the marine fishery appears to be at or near the limit of its' yield potential, preliminary trials with shrimp and fish aquaculture have shown considerable promise and certain ventures in this area are already underway.



### 3.7 Land Distribution and Agrarian Conditions

Classification of actual land use, farm size and degree of utilization is shown in ANNEX III.3.1. These figures were obtained from the census held in 1981 indicating that about 164,144 ha of land is distributed in different forms of tenure. About 22% of this land was privately owned and the remaining 78% is state land. The regional distribution of agricultural activity on this land, is very specialised. Main agricultural activity is rice where use of large land areas is inevitable. Currently about 85,304 ha (80,3%) is allocated for crop cultivation and the remaining 20,993 ha (19,7%) is under pasture totalling 106,296 ha of cultivable land. Table III.1.1 of the statistical ANNEXES indicates that more than 80.8% of the planted area of 92,900 ha stood under padi whereas the District of Nickerie accounts for most of the country's rice polders (80%), and approximately 16.5% of the cattle. . . With regard to farm size distribution while Suriname's agriculture is dominated by small farms about 67% of total planted area is cultivated by large farms. In the group 'large farms' we can distinguish two categories, one of Government-controlled estates (Rice, Banana, Palm-oil, Cattle, Sugar) and the other of large units in the hands of private entrepreneurs of whom most are in the rice growing industry. The majority of small farm holdings are either least or rented. There is a great number of small holdings (less than 10 ha) where in most cases farming is practised on a part-time basis with a second source of income outside the farm. With their limited financial resources further expansion of small holders land seems unlikely. With the upcoming agricultural projects, MCP, LOC, Tijgerkreek, etc., greater allocation to small holders is possible. Small farmers are seeking to organize themselves in cooperatives in order to increase the efficiency of distribution of inputs, fertilizers, seeds and parts. The legislation of irrigation water is under consideration and a decision on the water laws and water rights has to be made.



## IV THE PROJECT

### 4.1 Project Rationale

#### 4.1.1 General objective

To achieve the highest possible level of self-sufficiency in terms of milk and dairy products, thereby substantially reducing the drain of foreign exchange from the country and simultaneously reducing the nutritional vulnerability of the population.

#### 4.1.2 Specific Objectives

The specific objectives of this project are:

##### 4.1.2.1 Increased Total Production of Fresh Cow Milk.

Substantial increases in the production of fresh cows milk to replace imports and save foreign exchange.

##### 4.1.2.2 Efficient and Effective Marketing System for the Domestic Milk Output.

Comprehensive improvement in the physical and service infrastructure for the collection and processing of milk.

#### 4.1.3 Project Outputs

This project has been designed to achieve the following outputs:

##### 4.1.3.1 Technology Transfer

###### a. Extension

An efficient and effective Dairy production extension service is in place guiding dairy farmers for the continuous improvement of dairy production systems.



b. Demonstration Farms

Actual farms in the project area are established as models for each size category and are serving both for demonstration of improved technologies and for testing the technical targets erected for the project.

c. Training

Extensionists, and farmers in significant number have been trained in all aspects of Modern Dairy Technology and a training manual produced by the Project Administration is in general use in Suriname.

d. Research

An applied research program focussing on problems of nutrition of the dairy herd for milk and beef production is operational.

4.1.3.2 Marketing

An efficient collection and delivery system is in place serving effectively all dairy farmers in the Project Area.

4.1.3.3 Production Support Services

a. Adequate and Appropriate Credit is readily available to farmers for viable dairy farm investments.

b. An Adequate Supply of Essential Production Inputs is regularly available at reasonable cost.

4.1.3.4 Technical Cooperation

The capabilities of the staff, and the efficiency and the effectiveness of the operations of the Ministry of Agriculture, the Agricultural Bank, the Dairy Farmers Union and the Milk Plant, in support of the development of the dairy industry, will have been significantly improved.





#### 4.1.4 Description of the Project

##### Area and Beneficiaries

##### 4.1.4.1 Summary

The project area is the main dairy farming area in the country. Situated in the Middle region, it is the area South, South-West and West of Paramaribo within a radius of not more than 50 km from the city center, and encompasses five administrative districts (or parts thereof):

Wanica A or Kwatta

Wanica B or Houttuin

Wanica C or Santa Boma

Para, and

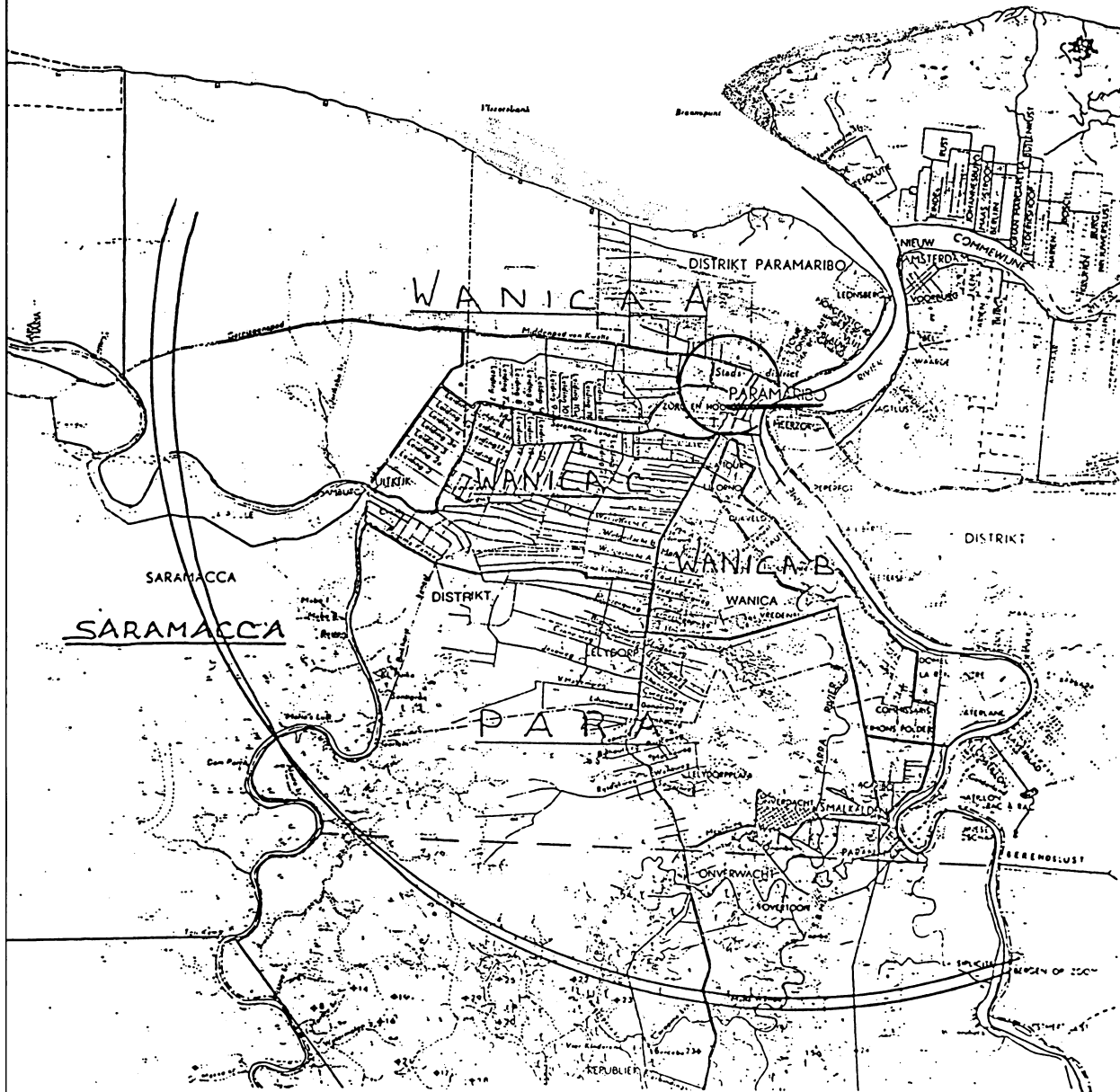
Saramacca.

Roughly, the Western boundary is Catharina Sophia in the Saramacca district and the Southern boundary is the Meursweg in the Para district. On the Eastern side the Suriname River is the boundary of the project area.

There are over 2700 dairy farms in this area, most of them occupying less than 10 hectares of land and producing very low yields of milk per cow and per hectare. This concentration of dairying is a ideal focus for a national dairy development project. The basic resources - albeit undeveloped - are present and a very ready market is at hand.

The direct beneficiaries will be the 800 - 1000 farmers who will be the primary participants. Ultimately, granted that the project is reasonably successful all dairy farmers in the area benefit.





MAP II  
TO SHOW APPROXIMATE PROJECT AREA  
SURINAME DAIRY PRODUCTION PROJECT.



#### 4.1.4.2 Physical resources

##### (i) Topography and Soils

The Project Area is situated partly on the young coastal plain and partly on the old coastal plain. An estimated 60% of the project can be considered as being on the young coastal plain and 40% on the old coastal plain.

The young coastal plain has a relative flat topography and consists of clay soils with sand or shell ridges in east-west direction. These soils are of fluvio-marine origin. The ridges occupy about 20% of the young coastal plain and the clay soils 80%. Expressed in the total Project Area we can estimate 12% ridges and 48% clay soils.

The old coastal plain consists of sandy soils with varying portions of clay. This landscape has a higher altitude than the young coastal plain with scattered depressions often linked to small creeks which eventually flow into rivers.

##### (ii) Climate

The climate may be generally described as wet tropical. Total annual rainfall varies between 1250 mm and 3250 mm per annum distributed over two rainy seasons interspersed by two dry seasons usually in the following sequence:

Short Dry Season : February to April  
Main Wet Season : May to Mid-August  
Main Dry Season : Mid-August to November  
Short wet Season : December to January



However there is a wide variation in the starting and ending dates of the seasons and in some years the shorter seasons may be undefined in time.

The mean annual temperature is 27<sup>0</sup>C with a range of 23<sup>0</sup>C to 31<sup>0</sup>C while the relative humidity in the developed coastal area remains at 81% year round.

The North East Trade winds prevail, blowing from East to West, but with relatively low force - averaging from 5 meters per second in the long wet season to 8 meters per second in the short dry season.

(iii) Water supply

The water supply to farms in the project is generally adequate, either from piped water or from wells or from farm ponds. Except for certain portions downstream in the Saramacca canal where industrial pollution is a problem, most of the ground and surface water in the area is wholesome and useful for ordinary agricultural purposes.





4.1.4.3 The Dairy Industry in the Project Area.Table 4.1.4.3Physical Description of Dairy Farms in Project Area.

Characteristics	Area			Para	Saramacca
	Wanica A	Wanica B	Wanica C		
Average Farm Size (ha)	11.4	4.9	4.3	16.0	14.4
Median Farm Size (ha)	5.2	4.0	4.0	10.0	7.0
Modal Farm Size (ha)	3.0	3.0	4.0	20.0	10.0
Average Plot Size (ha)	6.6	2.4	3.0	-	9.4
Farm Area on Highland (%)	34.0	45.7	46.0	73.0	56.0
Farm Area on Lowland (%)	66.0	54.2	54.0	27.0	42.0
Farm Area with Clay Soils (%)	73.0	42.1	81.0	7.0	49.0
Farm Area with Sandy Soils (%)	18.0	40.9	16.0	80.0	43.0
Farm Area with Loam Soils (%)	9.0	17.0	3.0	13.0	6.0
Farms with Irrigation (%)	3.0	0.0	90.0	0.0	15.0
Farms without Irrigation (%)	97.0	100.0	10.0	100.0	85.0
Farms with Drainage (%)	22.0	61.0	97.0	0.0	46.0
Farms without Drainage (%)	78.0	39.0	3.0	100.0	54.0

The table above gives the physical characteristics of Dairy farms in the three selected areas of Suriname. The variation in the farm size is considerable between areas, with average farm sizes being as low as 4 ha in Wanica C and as high as 16 ha in Para.



Both Para and Saramacca reflect the larger distances from Paramaribo, on the average 30 km and 41 km respectively, the larger size of farms and also the recency of occupation relative to the Wanica districts. In District Wanica which is closer to urban Paramaribo, the farmers have been longer established and have had more years of experience. In all of the areas, the dominant form of tenure was the state lease.

The relative amount of high or low lands in the farming areas is consistent with the location of the area with respect to the coast-line. The dominant soil type varies between areas with clay being more common in District Wanica, while sandy soils characterize eighty percent of the farms in Para. There is a lack of drainage and irrigation facilities in Para and Saramacca. A part of District Wanica is well equipped with drainage and irrigation services. This is related to the infrastructural works put in for the large banana project in that area. However, this infrastructure suffers from irregular maintenance.

#### 4.1.4.4 Land Utilisation on Dairy Farms in Project Area

Table 4.1.4.4 % of Dairy Farmers in the Area by Land use

Land use	Wanica	Wanica	Wanica	Para	Saramacca
	A	B	C		
Native Grasses	79	88	97	87	85
Improved grasses	27	13	17	78	12
Cutting Grasses	9	27	28	4	0
Vegetables	9	39	17	4	30
Fruit Crops	24	82	62	61	71
Plantains	3	13	0	13	50
Unused	27	13	3	65	69



It was not possible to obtain area owned allocated to different crops, which would be the preferred statistic in this case. As a second alternative the majority of farmers have pasture established for their cattle, in most cases this being only native grasses. Few farmers have established improved pastures with the exception of Para where seventy-eight percent of the farmers have pastures under improved grasses. The possibilities of expansion in Para and Saramacca are supported by the high levels of farms with unused land in these areas. This reflects both the presence of part-time farmers as well as the presence of larger land holdings in these areas.

#### 4.1.4.5 Production Infrastructure and Equipment on Dairy Farms

The table below shows the Production Infrastructure and Equipment on Dairy Farms

Table 4.1.4.5 Production of Infrastructure and Equipment on Dairy Farms

Facility	Wanica A	Wanica B	Wanica C	Para	Saramacca
Cow Pen (%)	79.0	90	96	100	85
Fencing(%)	66.6	22	38	83	62
Tractor	14.0	0	7	17	4
Motor Cycle	53.0	49	82	35	65
Jeep/Car	25.0	25	18	30	8
Pickup	28.0	22	21	65	27
Plough	11.0	0	7	7	4
Waterpump	8.0	1	0	78	15
Spraypump	53.0	31	38	83	58
Milking Machine	0.0	0	0	13	0



4.1.4.6 Pasture Utilisation and Management on dairy farms  
in the Project Area

The following table shows pasture utilisation and its management on dairy farms in the project area. The grazing of pastures combined with feeding of concentrates is the basis of the feeding system on dairy farms in Suriname. A few farmers support this feeding system by cutting grass for their cattle. The grazing system is classified as extensive in that there is a high land per animal unit ratio and low levels of pasture management are practised. Pasture maintenance activities are rudimentary; presently few farmers fertilize their pastures and all pasture cleaning activities are carried out by hand.

Table 4.1.4.6  
Pasture Utilisation and Management on Dairy Farms

Types of Pasture Management	Wanica A	Wanica B	Wanica C	Para	Saramacca
% of Farms Zero grazed	0	0	0	0	0
% of Farms Grazed Intensively	0	0	0	13	4
% of Farms Grazed Extensively	100	-	52	87	96
% of Farms with Pasture Division	33	22	-	87	12
% of Farms with No Pasture Resting Period	91	-	-	63	-
% of Farms Fertilising Pasture	3	9	31	17	4
% of Farms Cleaning Pasture by hand	83	100	97	91	100

N.B.: Blanks indicate lack of information





## 4.1.4.7

Production, Productivity and Disposal of milk on  
Dairy Farms in Project Area

Table 4.1.4.7

Production, Productivity and Disposal of Milk  
on Dairy Farms

Characteristic	Wanica A	Wanica B	Wanica C	Para	Saramacca
Avg. Milk Production/ Cow (kg)	5	4.0	5.0	6.2	3.6
Avg. Lactation Period (Days)	200	229	139	-	180
Avg. No. of Calves Born/Year	5	4	3	10	2
Avg. Farmer Milk Production/Day (kg)	19	15.0	10	53	5.5
Avg. Milk Sales/Day (kg)	20	14.4	9	47	8.6
Milk Disposal:					
% Selling to Plant	66	73	80	100	8.04
Production System:					
Dairy only (%)	33	3	23	0	4
Dairy Beef (%)	6	69	69	90	65
Beef Dairy (%)	-	25	4	0	31
Dairy Other (%)	56	3	4	0	0



For the entire area surveyed, the highest daily milk production record obtained was 11 kg in Wanica A. The lowest levels were found in Saramacca and Wanica C where 8 litres was the highest for daily milk yield per cow. Total milk production on individual farms was highest in Para and lowest in Saramacca. The main reason for this is that Para farmers receive a higher price for their milk and have easier access to inputs. The milk plant collects the milk daily in the area with its own truck. By contrast, Saramacca has no milk collection service. Lactation length varied from low of 115 days in Saramacca to 365 days in Wanica B. The milk produced in Wanica A and B was sold mainly to the milk plant. In Saramacca a large percentage (71%) was reported utilised at home; in the other areas this information was not recorded. The dual system of producing both milk and beef was the dominant characteristic on farms in Wanica B and C and Saramacca. Wanica A was the area in which the highest number of farms producing milk only were found. It was also the area with the largest number of dairy farms with activities other than beef (other livestock and crops).



#### 4.1.4.8 Farm Problems Reported on Dairy Farms

The table below shows the percentage of farmers identifying particular areas as problems on their farms. By far the two areas standing out as problems are feeding, and drainage and irrigation. Generally, this was reinforced when farmers indicated the type of changes they would implement if possible. However, the need for improved breeding, which was not stressed as a problem, was emphasised in terms of changes that would be implemented. Although few farmers received technical assistance from state extension services, it was not listed as a problem area.

Table 4.1.4.8.

#### Farm Problems on Dairy Farms

(% of Farmers indicating problem area as a constraint)

Problem Area	Wanica	Wanica	Wanica	Para	Saramacca
	A	B	C		
Feeding	100	100	69	74	42
Inputs	6	19	0	9	12
Animal Health	6	34	10	0	0
Breeding	31	10	0	0	0
Technical Assistance	11	7	10	0	0
Drainage & Irrigation	69	21	21	57	23
Prices & Marketing	14	33	0	4	19



#### 4.1.4.9 Limiting Factors and Constraints to Milk Production

The constraints, technical, social and economic in nature, identified as the main limiting factors associated with the low production and productivity found in dairy farms were as follows.

1. Most farmers identified feeding problems as their major constraint. Both pasture production and the supply system of supplement feeds are limited at the farm level.
2. Pasture management is at a very low level because of lack of knowledge, material, inputs, equipment and support service systems.
3. Herd management suffers as a result of lack of knowledge, inputs and support service systems.
4. Little attention is paid to animal health. A high calf mortality rate was found in all areas.
5. Educational levels of farm families were generally low.
6. Farmer's horizons are presently limited. They appear reluctant to change their basic systems because they do not know of alternatives.
7. Technical assistance of any kind is very difficult to come by. Farmers seemed not to demand technical assistance because they were unaware of the positive changes that might arise from it.
8. Credit, pricing and marketing arrangements need to be rationalized through economic analysis.





#### 4.1.4.10 Manpower Information on Dairy Farms

The following table lists selected aspects of manpower information on dairy farms in project area. Average family sizes for persons living on the farm ranged between 3 and 5 persons. The average age of parents on the farms ranged between 45 and 53 years. Average age of children ranged between 11 and 21. The majority of parents had some primary education while few had any secondary education. Generally the children received more secondary education. In Wanica A and Wanica C where information was available on family on-farm duties, it was found that all family members participated equally in milking and herding cattle. However, cutting grass and pasture management duties were more common among the male family members. The parents were found to spend more hours on the farm than the children, an average per day of approximately three to five hours.

The farms hiring labour are to be found mainly in Para and Saramacca. When labour is being hired it is on average two to three persons, four to six days per week at an average daily wage of Sfl 14 and Sfl 15.

Table 4.1.4.10

#### Manpower information on dairy farms

Manpower Characteristic	Wanica	Wanica	Wanica	Para	Saramacca
	A	B	C		
Average Family Size	3	4	5	3	4
Average Age of Father	51	48	49	51	53
Average Age of Mother	46	46	46	45	48
Average Age of Son	15	20	18	21	15
Average Age of Daughter	16	20	15	11	17
Parent's Education:					
% With Primary	72	77	78	61	47
% With Secondary	4	5	2	1.5	6
Childrens Education:					
% With Primary	80	83	46	28	62
% With Secondary	29	14	48	53	13
No. & % Farms with Hired Labour	4(11%)	1(1%)	2(7%)	12(52%)	10(38%)



#### 4.1.5 The Participating Dairy Farms

The project is designed to realize its objectives through improvements in productivity and production on 800 dairy farms ranging in size from 1.0 ha - 25.0 ha in the project area. These farms will be selected by the Project Administration in collaboration with the Ministry of Agriculture, the Dairy Farmers Union and the Agricultural Bank.

The project will focus on three model dairy farms which control land areas averaging

1.5 ha - 168 farms

4.5 ha - 500 farms

12.5 ha - 132 farms

(See table 4.1.8 Rate of Adoption)

These sizes are in fact the modal sizes in the 1984 survey of dairy farms in the 0-3 ha., 3-10 ha. and 10-25 ha. groups respectively.

#### 4.1.6 The Technical Coefficients

In order to realize the desired increase in production and productivity on the dairy farms within the project area a combination of technical conditions have to be put in place emphasising that one condition will not be realised without the other.

- On all model farms most of the area, except for a small portion for housing and buildings etc., high quality grasses will be planted. The stocking rate for zero grazing will be 10 AU/ha and for rotational grazing 4 AU/ha.



- Calf mortality will drop from 20% to 5%.
- The net calving rate will increase from 48% to 71%.
- Adult mortality will decrease from 10% to 2%.
- Culling rate of milking cows will be, as of year seven, a steady 20%.
- Milk production of cows in milk will increase from a present average of 4 litres to an average of 8 litres/day - an increase of 100%. This will go together with an extended lactation period from 180 (current average) to 290 days.
- This will result in a milk production increase per ha/year from 972 lt to 5220 lt - an increase of over 400%.

It goes without saying that the expected increase in production and productivity can only be realized if all conditions are optimal. Such as a controlled drainage system, rotational grazing system, fertilizing, high quality forage, improvement of the genetic quality of the animals and generally improved management on the farms, including the use of essential records and simple accounts.



4.1.6.1 Project Targets(i) Herd Performance Targets

INDICATORS	CURRENT	GOAL YEAR 5	GOAL YEAR 10
Milk Prod/cow/day	4.0 lt.	7.0 lt.	8.0 lt.
Lactation length	180 days	260 days	290 days
Milk prod/cow/lact.	720 lt.	1820 lt.	2320 lt.
Milk prod/cow in the herd	432 lt.	1365 lt.	1740 lt.
Calving %	60	75	75
Calf Mortality %	20	8	5
Adult Mortality %	10	2	2

(ii) Farm Productivity Targets

	Y0	Y5	Y10
<u>12.5 ha model</u>			
improved grass (ha)	2.4	12.0	12.0
stocking rate (AU)	1.3	3.4	4.0
milkprod/ha/year/ltrs	360	3418	4454
<u>4.5 ha model</u>			
improved grass (ha)	0.8	4.0	4.0
stocking rate (AU)	3.5	4.0	4.0
milkprod/ha/year/ltrs	864	4085	4640
<u>1.5 ha model</u>			
improved grass (ha)	0.3	1.5	1.5
stocking rate (AU)	4.5	9.2	9.7
milkprod/ha/year/ltrs	1152	8190	11600





#### 4.1.7 The Farm Models

In discussing the farm models a comparison is made of the current situation and the proposed improvements. One has to realize however that the models presented are theoretically derived by extrapolation of the dairy survey 1984. In all farm models the proposed technological improvements are very similar and are mainly directed to:

- a. Improved nutrition of the animals
- b. Improved herd management
- c. Supply of essential production inputs

The models presented are the sizes most represented in their range.

Model A 1.5 ha. is the modal size in the range 0.0 to 2.99 ha. using 0.5 ha. class intervals.

Main characteristics:

- a. part time farmer
- b. low stocking rate
- c. mostly native pasture

Model B 4.5 ha. is the modal size in the range 3.0 to 9.99 ha using 1.0 ha. class intervals.

Main characteristics:

- a. part time farmer
- b. high stocking rate
- c. mostly native pasture

Model C 12.5 ha. is the modal size in the range 10.0 to 25.99 ha. using 4.0 class intervals.

Main characteristics:

- a. 50% full time farmers
- b. very low stocking rate
- c. mostly native pasture

(See table 4.1.7 Farm Size Frequency by Districts).



TABLE: 4.1.7 FARM SIZE FREQUENCY BY DISTRICTS

FARM SIZE	SURINAME	PARA	SARAMACCA	TOTAL	%	TOTAL NO OF FARMS* IN THE DISTRICTS
<b>CLASS INTERVAL</b>						
<b>0.5 HA</b>						
0 + 0.5	4			4	2.2	61
0.6 + -1	9			9	5.0	137
1.1 - 1.5	12		1	13	7.2	199
1.6 - 2.0	9		4	13	7.2	199
2.1 - 2.5	5			5	2.8	78
2.6 - 2.9	3			3	1.7	47
<b>SUB-TOTAL</b>	<b>42</b>		<b>5</b>	<b>47</b>	<b>26.1</b>	<b>721</b>
<b>CLASS INTERVAL</b>						
<b>1 HA</b>						
3.0 - 3.9	17	2	3	22	12.2	338
4.0 - 4.9	31	2	3	36	19.9	552
5.0 - 5.9	6	1	1	8	4.4	122
6.0 - 6.9	8	3		11	6.1	169
7.0 - 7.9	4	1	2	7	3.9	108
8.0 - 8.9	4			4	2.2	61
9.0 - 9.9	2	1		3	2.2	61
<b>SUB-TOTAL</b>	<b>72</b>	<b>10</b>	<b>9</b>	<b>91</b>	<b>50.9</b>	<b>1411</b>
<b>CLASS INTERVAL</b>						
<b>4 HA</b>						
10.0 - 13.9	7	3	7	17	9.4	761
14.0 - 17.9	2	3	1	6	3.7	91
18.0 - 21.9	2	3	1	6	3.3	91
22.0 - 25.9	1	1	1	3	1.7	47
<b>SUB-TOTAL</b>	<b>12</b>	<b>10</b>	<b>10</b>	<b>32</b>	<b>18.1</b>	<b>990</b>
25.0 - 44.9	4	2		6	3.1	85
50 >	2	1	2	5	2.3	64
<b>TOTAL</b>	<b>132</b>	<b>23</b>	<b>26</b>	<b>181</b>	<b>100.5</b>	<b>3271</b>
<b>x</b>	<b>72.8</b>	<b>12.7</b>	<b>14.5</b>	<b>100</b>		

Source: 1984 Suriname, Para, Saramacca Districts Dairy Farm Survey  
Unpublished information

\* Estimated from the percentage found in the survey sample

\*\* Total farms considered in Suriname, Saramacca and Para Districts.



#### 4.1.7.1 Model A 1.5 ha. Dairy farm

##### (i) Current situation.

This farm size represents 27.4% of the total number of existing farms in the districts of Wanica A,B,C, Para and Saramacca, and is the modal size in the range 0 - 2.99 ha. These farms are managed by part-time farmers, whose main income is derived from employment outside the farm. Much of the farm work is done by the farmer's wife and children. According to the survey carried out by the IICA, these farms seldom have cultivated pastures, and very often animals are grazed on the side of the road.

The natural pasture consisting of native grasses and weeds and small amounts of supplement feed (rice bran) are the main source of feeding. As a result the animals are usually in poor condition and therefore production and productivity on the farm is low (Milk production/farm/year: 1728 ltrs).

The higher production/ha/year in this model compared with the 4.5 ha and 12.5 ha model is due to the fact that in this 1.5 ha model the farmer has less animals to take care off and supplies the animals with selected cut grass taken from outside the farm.

Milking is done once a day with calf. The second milk is given to the calf for two reasons: a) the very low daily production, and b) there is no milk collection in the afternoon.

Calves are very often in poor condition because of insufficient milk. There is no regular treatment for internal and external parasites, and minimal, if any, supplementary feeding. This results in a very slow growth rate, and often heifers do not come into production before 42 - 48 months of age.



(ii) Proposed improvements

The most important improvement in management of these small farms is related to the grass feeding system. Depending on the type of soil on the farm either Elephant grass (*Pennisetum purpureum*) or Antelope grass (*Echinochloa polystachia*) will be planted on 1.25 ha and managed under the cut and carry system. The cows will be kept in pens where grass will be supplied. The cattle manure collected will be returned to the grass plot under optimum conditions this system should produce around 150 tons of green forage per annum. In addition to grass the animals will receive an additional 0.5 to 2.0 kg/a.u./day of supplementary feed. This improved feeding system will also enable the farmer to double his stocking rate. In addition certain other management practices will be improved.

Milking will be done twice a day while calves will be hand fed. Treatment against internal and external parasites will become regular practice. The California mastitis test will be carried out twice a month to detect udder infection in time.

For genetic improvement artificial insemination with semen from tested bulls will be used. The farm will be provided with a proper cow and calf pen and facilities to store milk. A chopping machine would be used in order to maximize benefits from the green forage supplied to animals. Simple recording systems will be introduced.

4.1.7.2 Model B 4.5 ha Dairy farm(i) Current Situation

This farm size represents 51.9% of the total number of existing farms in the districts of Wanica A,B,C, Para and Saramacca (Table 4.1.7). The 4.5 ha model is the most represented size in the range from 3.0 - 9.99 ha.





The farms are managed by part-time farmers whose main income is derived from outside the farm. The main source of labour is the farmer's family, but some outside labour is also required. Because of the High Stocking Rate (14.0 a.u/ha) combined with very poor management of the natural Grass Pasture with, usually, only a small area ( 0.8 ha) of improved grass milk production is very low (2.3 l/day) and the animals are generally in poor condition. Reproductive performance is also poor - long calving intervals, with heifers first calving at an age of 42 - 48 months.

Supplemental feed, such as ricebran, is given, but not in adequate quantities. No specific grazing system is practiced. As there is no pasture division animals graze anywhere in the farm. The total herd, including young bulls, is kept together, so that inbreeding occurs to some extent.

Milking is done by hand only once a day. The second milk is suckled by the calf. Milk from these farms have a very high bacterial count ( 40 m/ml) because of unhygienic conditions and poor milking practices. Because of poor nutrition, and internal and external parasites, calves also are usually in poor condition. Animals are treated only when it is obvious that the animal is sick. This again results in reduced growth of the young animals, affecting their future production and productivity.

There is little interest in genetic improvement.

The cowpens (if any) are in very poor condition. Calves are usually kept tied to a post of the cowpen and under unhygienic conditions. Proper clean water supply is not available. No records are kept.



(ii) Proposed improvements

Because of the already high stocking rate on these farms, no increase in animal units is proposed. The main investment, and changes in technology will be directed to achieving a rapid improvement in the quantity and quality of pasture in order to maintain and adequately feed the animals. Most of the area will be planted with cultivated grasses such as Brachiaria or Echynocloa species based on soil conditions. 0.5 ha will be used for elephant grass for making silage and to supply high quality grass for the calves in the pen. A rotational grazing system will be implemented by using an electrical or solar fence. Animals will receive supplementary feeding of up to 2.0 kg/day. Fertilizer will be used at a rate of 200 kg/ha/year. On-farm drainage will be carried out if necessary.

Hygienic milking practices will be introduced and milking will be done twice a day while calves will be hand fed. Treatment against internal and external parasites would become a regular practice. The California mastitis test will be carried out twice a month to detect subclinical udder infection in time. For genetic improvement semen from proven bulls will be used through A.I. Service. Heifers will be bred at the age of 24 months, or a live weight of 250 kg. Cows should be bred 45 - 60 days after calving and will be dried out seven months after their last effective insemination.

The farm should have a good cow and calf pen and a milking parlour with a single unit milking machine with a capacity of milking 12 cows/hour to save labour and produce a better quality of milk.

The farmer will be trained and encouraged to keep and use simple production, breeding, health and accounting records.



#### 4.1.7.3 Model C 12.5 ha. Dairy farm

##### (i) Current situation

This size of farm represents 15.5% of the total number of existing farms in the districts of Wanica A,B,C, Para and Saramacca. The 12.5 ha model is the modal size in the range from 10 - 24.9 ha. From the total of 428 farms in this range 216 farms are found in the range from 10.0 - 13.9 ha.

These farms have the lowest per hectare productivity (360 l milk/yr) and a low stocking rate (1.3 a.u./ha). They are managed by a part-time farmer whose income is partly derived from outside the farm, or by a fulltime farmer. The main source of labour is the farmer's family while much of the field work is done by hired labour. The average herd size is 15.6 a.u., but at present, the area of improved pasture is only 2.4. The milk production/year/farm amounts to 4320 litres. Because of the low stocking rate, the animals are in better condition than those on the 1.5 ha and 4.0 ha farm models.

The available green forage consists of natural grasses and weeds, supplemented with ricebran whenever available. The genetic capabilities of most of the cows is higher than would be expected from actual present production, which is low mainly due to the poor feeding system.

Milking is done by hand once a day, and the second milking is suckled by the calf. There is no control of internal and external parasites, nor of subclinical mastitis. Some treatment is carried out only when it is obvious that an animal is sick or heavily infested with ticks. The handling of the milk is poor, and detergents are rarely used for washing before or after milking.



(i) Proposed improvements

This farm model has great possibilities for improvement. From investments in a better feeding system and an increase of 200% in the number of animal units combined with improved management practices production and productivity on these farms may be substantially increased. 12 ha will be planted with high quality and high yielding grass such as Enchynocloa polystachia and Brachiaria species. 0.5 ha will be planted with elephant grass for making silage and to supply grass for making silage and to supply grass to calves. 2.0 kg/day of supplemental feed will be given to milking cows and in-calf heifers, while young heifers will receive 1.0 kg/day.

Milking will be done twice a day with a portable double unit milking machine with generally improved sanitation in milk handling. Animal health practices will be introduced including preventive control of udder infection. Regular control and treatment of internal and external parasites will be carried out.

Through artificial insemination a gradual genetic improvement of production will be obtained. Where necessary the cow and calfpens will be renovated. The boundary fence will be repaired and fencing for a rotational grazing system will be installed with the use of solar or electric fence.

The animals will have available at all times clean drinking water while water also will be available for washing. The farmer will be trained and encouraged to keep simple production, breeding, health and accounting records.





#### 4.1.8. Rate of Adoption

Approximately 60% of the over 2700 dairy farms in the project area meet the following simple criteria:

- have a minimum of 1.25 ha of land available and suitable for planting fodder grass
- have at least three (3) milking cows
- occupy less than 25 ha of land

A conservative estimate is made that of these 1500 - 1600 farms meeting the above criteria, that at least 50% will be desirous of participating in the project and willing to meet the fairly stringent conditions that the project administration will impose. The expectation is that about 800 farms will participate and on the basis of the frequency of size classes, the following distribution of the various sizes of farms participating in the project area has been made:

Range 1.5 - 3.0 ha -	Mode 1.5 ha -	168 farms
" 3.0 - 10.0 ha -	" 4.5 ha -	500 farms
" 10.0 - 25.0 ha -	" 12.5 ha -	132 farms

Assuming that the rate of adoption follows the normal curve which is experienced in agricultural transfer-of-technology programs, one would expect only 15% of the farms to join in the first year. The detailed aggregation model has been computed in the following table (Table 4.1.8).



TABLE 4.1.8

ADOPTION RATE OF IMPROVED TECHNOLOGY BY FARM TYPE AND DISTRICT

FARM MODELS	DISTRICTS	TOTAL NO.	NO. FARMS JOINING IN YEAR				
			1	2	3	4	5
1.5 HA FARM MODEL 'A'	SURINAME	120	20	30	30	30	10
	SARAMACCA	48	8	10	10	10	10
	PARA						
4.5 HA FARM MODEL 'A'	SURINAME	380	60	80	80	80	80
	SARAMACCA	80	10	20	20	20	10
	PARA	40	8	8	8	8	8
12.5 HA FARM MODEL 'A'	SURINAME	60	5	15	15	15	10
	SARAMACCA	32	6	6	8	6	6
	PARA	40	5	10	15	5	5
TOTAL		800	122	179	186	174	139
CUMULATIVE TOTAL			291	487	661	800	

Represents approximately 50% of the total number farms in the size range around the mode



## 4.2 Review of Other Dairy Development Proposals

### 4.2.1 Program for Improvement and Expansion of Dairy Farming in Pad van Wanica Area

This project is in actuality a series of supportive actions.

- the construction and reconditioning of access roads.
- the reconditioning of the main drainage canal.
- the establishment of a 10 hectare nursery for pasture grasses for distribution to farmers.

For the area in question the infrastructural improvements are urgently needed and it is recommended that the regional administration for the area should implement them at an early date. The pasture grass nursery is a good project which is enlarged and incorporated as the grass multiplication centre in this document.

### 4.2.2 Miscellaneous Projects Proposed under the national Reconstruction Plan (1985 - 1995)

These are several assorted measures which individually and together were designed to improve and expand milk production.

- a) Upgrading of the Artificial Insemination Service (this is now underway as an EEC-financed Project).
- b) Financial and economic studies of the dairy farming enterprise to ensure reasonable profitability.
- c) Increase of the national dairy herd by 2000 milk cows and increasing of the milk yield to an average 10 liters per day. This would involve the establishment of new dairy farms in selected areas.
- d) The setting up of experimental farms by animal husbandry experts to develop basic technical information for transfer to commercial dairy farms.
- e) Study, evaluation and recommendations relating to the supply of concentrate feeds for livestock.



These proposals are all valuable, even though somewhat vague. However, it is difficult to see them being realized outside of a comprehensive plan for livestock development.

#### 4.2.3 State Farm Settlement Project

This was a recently designed project in which it was proposed to settle 45 farmers on 280 ha. of land adjacent to the State Farm. Each farmer would maintain 22 A.U. including 15 milking cows maintained under a zero-grazing regime.

This project is theoretically feasible but very difficult to implement in practical terms, for several reasons of which the most important is that the required technology is difficult and complex and demands a high degree of farmer capability as a dairyman and farm manager. Such expertise is not readily found in Suriname - which means that there must be a period of intensive training provided for the settlers and this must be followed up on the farm by an intensive farm management service. The project was estimated to cost Sfl 330000. It was not, and most probably will not now, be implemented.





#### 4.3 Review of Recent Studies Relating to Dairy Development in Suriname

##### 4.3.1 'Policy Background'

In October of 1985 the IICA Office in Suriname in collaboration with technicians of the Ministry of Agriculture, developed a short study 'Definition and Analysis of the Policy Background for the Development of the Dairy Industry in Suriname'.

This analysis of the policy environment which exists in Suriname for the development of the dairy sub-sector was made by examining two levels of administrative expression.

One level: the actual conditions existing by law and by custom in the operation of the dairy industry as it evolved over the previous two and one half decades;

The second level: the doctrinal framework - the perception of the ideal situation of the dairy industry which the Government would like to see in the future and the implicit strategies prescribed for approaching that goal.

The main recommendations or guidelines for policy or policy adjustments were concerned with the following:

1. Ensuring that input supply shortages/prices do not limit or constrain expansion of production.
2. Rationalizing the anomalies and problematic areas of the marketing system, namely: Price  
The Delivery System  
The Operation of the Milk  
Processing Plant



3. The provision of adequate institutional infrastructure for Development.
  - A Dairy Farm Management Advisory Service
  - An efficient Artificial Insemination Service
  - Adequate Credit Facilities
4. Examination of the appropriateness, relevance and urgency of programs, projects and diverse proposals against the total dairy development aims.
5. The urgent need to review policies which affect consumption of milk.
6. The need to develop sensible and logical strategies which would ensure the design and elaboration of a comprehensive, coherent and practical set of policies and policy measures for the development of the sub-sector.

As may be gathered from the above, several aspects of the document and its' recommendations anticipated this feasibility study. As discussed in Chapter VI herein, the rationalization of policies and policy measures remains one of the most important outstanding issues conditioning the development of the Dairy Sub-sector.

#### 4.3.2 Report on Raw Milk Price: 1986

This report of the Committee appointed by the Minister of Agriculture in December of 1985 recommended an increase of 15ct per litre on the price of milk. Ultimately the price was increased, in July of 1986 by 20ct to the present level of 90ct. per liter.



This report is of current interest because it details a cost-of-production calculation, which presents a rough concept of the production system as visualized by the Dairy Farmers organization. The system presented is idealized when it deals with inputs and costs but reflects the low yields which are actually the result of poor technology and management. This is often the case when such theoretical production models are used.

#### 4.3.3 Report on the Milk Collection System: 1987

At the request of the Minister of Agriculture, a Committee of three made a diagnostic study of the milk collection (farm-to-processing plant) system. The conditions described in their report have deteriorated even further during the last eight months and their main recommendations remain valid. The system is more-or-less as is described in section 3.4.3.2 herein and several of the recommendations are incorporated in the design of the milk marketing component of this project in section 4.4.2.



#### 4.4 Project Components

The implementation of this project is planned around the following essential components.

The Transfer of Improved and Appropriate Dairy Farming Technology.

using a combination of specialised extension demonstration and - to a limited extent - applied research.

Provision of Adequate Readily Accessible and Timely Credit.

to finance on-farm capital investment by dairy farmers.

Strengthening and Expanding the Raw Milk Collection System

of the Melkcentrale N.V.

Supply of Essential Inputs at reasonable cost

##### 4.4.1 Transfer of Technology

From analysis of the production constraints identified in the survey of the area and of the existing resources of the farms certain key technologies are considered as the priority introductions into the management of the farms in order to increase their production and productivity. These are:

- a. Improving the feeding system by promoting quality grass as the main source of nutrition. Farmers will be encouraged to established grasses such as Antelope (Echinochloa polystachia), Brachiaria Species and Elephant grass (Pennisetum purpureum) for cutting for calves and penned animals. These grasses are already well known to Suriname Dairy Farmers and are adapted to the different soil conditions of the project area. Rotational grazing will be introduced into pasture management. Where surplus grass is available silage is made for supplementing grass in dry periods. Grass will be supplemented by concentrate feeding.





- b. Improving the herd breeding practices and the genetic quality of the herd using imported frozen semen from tested bulls - mainly of Holstein, Jersey and Zebu breeds, but the project will encourage introduction of other dairy breeds of proven adaption to tropical conditions such as the Jamaica Hope and the Cuban Siboney.
  
- c. Improving Production Facilities. The use of solar or line electric fencing for proper rotational grazing; the use of small milking machines and the rehabilitation and modification of the facilities for milking, calf pens, etc.

#### 4.4.1.1 Extension

To properly implement the technology transfer component an efficient specialist extension service must be in place at the Ressort (district) level. The proposal is to concentrate the project activities through a field team of three (3) Dairy Production Coordinators and ten (10) Dairy Production Assistants.

Five of the D.P.A.s will be appointed out of the first training course run by the project in the first months of the implementation. The second five would be recruited in the middle of year 3 of project implementation.

Each DPA will be provided with a small 4-wheel drive vehicle to afford rapid mobility.

Their main function would be to stimulate and assist the farmers to adopt, as rapidly as possible, the desirable improvements in farm organization and management advanced within the project and to work closely with the credit officers of the Agricultural Bank to ensure that the farmer obtains the financing he requires quickly and uses it wisely.



#### 4.4.1.2 Demonstration Units - The Pilot Dairy Farms.

These farms are an essential part of the Transfer of Technology Component of the Project.

The primary purpose of the Pilot farms is to demonstrate in visual and practical terms the advantages of adopting improved technologies and systems of dairy farm organization and management.

A secondary purpose is to test, in the real world, the assumptions made in developing the models around which the project was originally designed and guide the project management and participating farmers as to what adjustments should be made in the course of project implementation.

The Pilot farms will be ordinary farms selected for the purpose in collaboration with the Dairy Farmers Union which will be developed and operated under the direct guidance of the Dairy Production Coordinators. Not only must the Pilot farms be operated according to the accepted Project standards, they must also out-pace most of the other farms in their areas in terms of results, so that whenever doubt arises in the mind of a farmer as to cost, feasibility or effectiveness of a technology which is new and different, and which he wishes to adopt, he can personally and directly check it out on the Pilot Farm.

Five Pilot farms will be organized in the five districts of the Project area, their location by size being decided by the actual sizes of dairy farms which are commonest in each district (see ANNEX 4.1.1: farm size Distribution by District)

Para	-	Pilot farm of	Approximately	12.5 ha
Saramacca	-	"	"	12.5 ha
Wanica A	-	"	"	4.5 ha
Wanica B	-	"	"	4.5 ha
Wanica C	-	"	"	1.5 ha



The farmers whose farms are identified as Pilot farms would be required to enter into a formal agreement with the Project Authority which would cover.:

- Access to the farm at all times by the Dairy Production Coordinators.
- Access to the farm by individual farmers or groups of farmers at times set by mutual agreement.
- Maintenance of simple records which would be available for monitoring by Dairy Production Coordinators
- Access to the farm for special Demonstrations arranged by mutual agreement with the Dairy Production Coordinator.
- Use of Descriptive signs and labels throughout the farm in keeping with its role as a Model Demonstration Unit.

The incentive which would be offered to the farmer who agrees to the use of his farm as a Model farm is that the Project Administration would pay - as a rebate, each quarter - an amount equal to 15% of his actual operating costs (including his own and unpaid but recorded family labour).

These agreements would be for five years in the first instance.



#### 4.4.1.3 Training

The training of the Dairy Production Assistants and the farmers is a cornerstone activity of the project. The training of both will be among the main responsibilities of the Dairy Production Coordinator and the specialist consultants. There will be one basic design for the training course, but for the DPA's more emphasis and detail will be placed on the theoretical concepts than for the farmers. The practical aspects will however be identical and preferable both groups will work together for the practical training.

An outline of the basic course is provided at ANNEX IV.4.1.

Training will be, of course, not restricted to formal lectures and practicals but will be considered a continuous responsibility of all technicians in the project whether trainer or trainee.

The farm management specialist would have the additional responsibility during the consultancy of compiling and editing with the Dairy Production Coordinators and other Specialists, a Manual of Dairy Technology for Suriname.

This document will be published by the project in collaboration with the information Services Division of the Ministry of Livestock and Fisheries. This manual would cover all the training topics and include appropriate data which would assist the Dairy Farm Manager in Suriname. It would be published initially in Dutch. While copies would be given to the Project Staff - one to each position - this manual would be sold, at cost, to everyone else.





#### 4.4.1.4 Applied Research Programme

At this time in Suriname there is no Research Program either planned or in progress, from which relevant data may be derived to guide the development of the Dairy Sub-sector.

While the Animal Husbandry Division of the Ministry of Agriculture has a functional responsibility to carry on a livestock research program (See Section 3.4.1.2) it has not the human, physical or financial resources to do this.

Only a very limited research effort is known to exist in Suriname although there are on the staff of the University there are two well-qualified animal nutritionists and one grassland specialist.

It is therefore appropriate, in fact one may say necessary, that this project should sponsor an applied research program in certain priority areas to provide solutions to problems which have been identified as constraints to dairy development.

One area in which research is urgently needed is that of nutrition, - particularly that based on grasses and forage legumes - but also into local availabilities or potentially available supplementary feeding stuffs, many of which remain undeveloped and underexploited.

Other areas which urgently require research have to do with improving the quantity and quality of beef produced from the dairy herd; the incorporation of legumes in pastures; calf feeding systems and forage conservation.

These research lines have considerable potential for contributing useful results to the industry - and to the Project - in a short space of time.

Considering that the University already possesses qualified scientists in the field and the basic infrastructure, the Project should financially sponsor three or four short-term research projects during the first three years.



The selection and overall design of these projects should be the task of the Project Manager, the Deputy Director for Animal Husbandry of the Ministry of Agriculture and the University Authority, advised, of course by the researchers themselves.

For the purposes of the project proposal it is not possible to do more than to recommend a token sum which may be allocated by the Project over a three-year period as is suggested in the general budget below.

Table 4.4.1.4

## Estimated Research Support Budget

(US\$000)

<u>ITEMS</u>	<u>YEAR1</u>	<u>YEAR2</u>	<u>YEAR3</u>	<u>TOTAL</u>
Field Labour	3.0	3.0	3.0	9.0
Material and Laboratory Equipment	10.0	5.0	5.0	20.0
Small Field Equipment	<u>6.0</u>	<u>2.0</u>	<u>2.0</u>	<u>10.0</u>
TOTAL	<u>19.0</u>	<u>10.0</u>	<u>10.0</u>	<u>29.0</u>



#### 4.4.2 Milk Marketing Component

##### 4.4.2.1 Milk Collection System

It has already been indicated that the current milk marketing system is inefficient even with the current low production in the project area. With the greatly increased production which one expects when this project begins to mature, marketing becomes even more critical, particularly the farm-to-plant segment of the marketing chain.

It is proposed in this project to approach the marketing problem in the simplest and most direct way, and also the most inexpensive. The solution proposed is to reinforce and organize the "private collection" system and to direct its expansion as production increases.

- a. On the basis of the quantum of raw milk which is offered to the milkplant from each sub-district, individuals who reside in the project area will be contracted by the plant to collect morning and evening milk and deliver to the plant before 1030 hrs and before 1830 hrs every day, returning the cleaned churns from the previous delivery as they make a new collection.
- b. These contracts will be awarded by tender on the basis of criteria decided by the Melkcentrale in collaboration with the Dairy Farmers Union.
- c. On the basis of a contract award each successful tenderer will be given the opportunity to import a suitable transport vehicle (a 3-ton open tray truck would be the standard) using the foreign exchange facility provided through the Agricultural Bank for the purchase of essential equipment, vehicles and supplies within the project line-of-credit.
- d. Each contract would stipulate the area within which the collector would operate and each collector would not be allowed to exceed the ordinary capacity of his vehicle beyond a rated 10 - 15%.



- e. The Melkcentrale in collaboration with the Dairy Farmers Union, will retain the prerogative within each contract, to alter the boundaries of the collection sub-districts to accommodate significant changes in the quantum of milk available from existing farms, on the entry of new farms into production.
- f. The contractors will continue to be paid Sfl 0.15 per litre of raw milk delivered to the milk plant provided it is delivered within the period 0700 hours to 1830 hours.
- g. The contractors will not be paid for milk which is found to be unuseable when tested. (This means that contractors will exert, with guidance, their own informal sanctions at the farm level - a not undesirable pressure for quality).

With this contracted collection system in place and operating satisfactorily, the milk plant collection trucks would be confined to providing a buffer service where new production or increased production cannot yet be taken up by contractors or where emergency collections are required for short periods.

The total estimated requirements for churns and trucks are computed in Table 4.4.2. During the five-year project implementation period the Melkcentrale will provide an additional 520 thirty - litre milk churns to farmers (cost Sfl 300 - each) and the line of credit will finance the purchase of up to thirty (30) 3-tonne trucks as they are required by bona-fide contractors to the milk plant.





#### 4.4.2.2 Reception Line, Milk Quality and Grading

As production volume increases, the Melkcentrale will take the necessary steps to improve procedures for reception and testing of milk. The use of automatic sampling of mechanisms would be one such improvement. Another would be the computerization of intake and payment records.

The tests for minimum solids-not-fat and minimum butterfat would of course continue, but expanded to detect boiled milk, reconstituted milk and mixtures of these with fresh milk.

The milk plant should try to identify all farmers which produce milk with consistently high bacterial content and arrange, through the Project Administration, for them to receive special advice and assistance to improve their sanitation practices.

By the end of year one of the project the milk plant should arrange to pay a premium for all milk with a high butterfat of 3.75% or over, perhaps as follows:

for butterfat of 3.75 - 3.99% a premium of Sfl 0.05.

for butterfat of 4.00% and over a premium of Sfl 0.10.

#### 4.4.2.3 Milk Plant Capacity

The current processing capacity of the milk plant is severely limited by the age and poor condition of much of the equipment. There is no question, according to the plant engineers, of reaching its rated capacity per shift, or of introducing more than one shift per day unless there is an extensive rehabilitation of the processing line.

Since this project is expected to substantially increase the daily deliveries to the plant during the first year of implementation, it is necessary that some finance be provided from project funds to the milk plant to ensure that it has sufficient installed capacity by year two of project implementation to handle the influx.

The total cost of the necessary equipment and parts ~~of~~ Paramaribo is estimated to be Sfl ~~2.88~~ million (US\$ ~~160~~ million).

2.88

1.60



**ESTIMATES OF INCREASES IN VOLUME OF RAW MILK MARKETED  
FROM PROJECT AREA AND OF ADDITIONAL CHURNS AND TRANSPORT  
VEHICLES REQUIRED FOR CONTRACT COLLECTION SYSTEM**

TABLE: 4.4.2

PROJECT YEAR END	DAILY VOLUME OF MILK AVAILABLE (L)	MORNING MILK NO. COLLECTION	NO. 30 LTR CHURNS REQUIRED		NO. OF ADDITIONAL 3-TONNE TRUCKS REQ.	
			TOTAL*	INCREMENT	FOR CONTRACTORS†	FOR MILK PLANT
0	13,000	8,700	870			
1	14,300	9,600	960	90	10	2
2	15,700	10,500	1,050	90	10	
3	17,300	11,600	1,160	110	5	
4	19,000	12,700	1,270	110	3	2
5	20,900	14,000	1,400	130	2	
6	23,000	15,400	1,540	140	2	
7	25,300	17,000	1,700	160	2	
8	27,900	18,700	1,870	170	2	
9	30,700	20,600	2,060	190	2	2
10	33,700	22,600	2,260	200	2	
SUBTOTAL TO YEAR 5				530	30	4
GRAND TOTAL TO YEAR 10				1390	40	6

\* This estimate is based on morning milk collection and allows 50% extra for unfilled churns and duplicates that basic number allowing that churns will cycle continuously between farmer and milkcentrale. (coincidentally this is equal to 1/10 of the litre volume of morning milk).

† There are now 18 collectors with old trucks who will be given the opportunity to purchase new trucks under the project facility. In addition the increment in production will naturally be evenly spread throughout the project area, so that the actual collection quotas for each collector will be lower than the optimum and more. Contracts will be required than the total increment in production might suggest.



#### 4.4.3 Production Support services

##### 4.4.3.1 Credit

The farm credit component is the major component of the project. It is mainly through this finance and the incentive it presents that the main technological improvements will be achieved on the farms. The primary incentive is that the small farmer has ready access to adequate finance at reasonable cost. A secondary incentive, but one which is of significant value in the situation in Suriname, is that the credits will provide foreign exchange to finance the importation of essential production inputs, which are otherwise very difficult to obtain.

Based on a survey of the project area made in 1984, the project centres on three modal sizes of farms, and it has been assumed that the rate of their incorporation into the project would be as follows:

Modal Size of farms	No of farms by year of Incorporation					Total No
	1	2	3	4	5	
1.5 ha	25	40	40	40	20	168
4.5 ha	78	108	108	108	98	500
12.5 ha	16	31	35	26	21	132
Total each Yr.	122	179	186	174	139	800
Cumulative total		301	487	661	800	

While the return on investment which is estimated for these farms is fairly rapid, all require a grace period of four to six years before returns reach a level which would allow repayments of the principal. This will depend, however on the amount of total investment required and the portion thereof that the farmer needs to borrow in each case.



The estimate of the total credit required in the first five years, allowing for some recovery of principal from year 4, amounts to \$ 9.2 million. This estimate is predicated on the assumptions that all of the farms in the project will borrow up to the limit of their needs and that there is a reasonably satisfactory rate of adoption of technology, generating the level of investment forecast in the period.

At the same time, it would not be unreasonable to assume that farmers other than those directly involved in the project will require financing and would be allowed access to the credit line for similar purposes and with similar loan conditions as the original participants.

The interest rate to farmers would be the same as is generally set for all farmers by the Agricultural Bank. This is currently 8% per annum.

#### Administration of the Credit

The Agricultural Bank will administer the farm credit on the basis of technical inputs and recommendations of the Project Implementation Unit. In the first year of the project implementation the bank would employ two field officers who would work closely with the project officers. By the beginning of the second year it would be necessary to employ an additional two field officers, making a total of four, who would deal almost exclusively with the dairy farming sector during the project implementation and after. These officers would be paid by the bank but would be facilitated with small off-the-road vehicles out of project funds.





### Credit Conditions and Procedures

While the financial conditions of each loan will be set by the Agricultural Bank, the technical conditions will be developed within a budgeted farm plan prepared by the farmer with the assistance of the Dairy Production Assistant for his area.

For the sake of consistency, control and uniformity, all applications for loans for dairy farming would be required to satisfy the technical criteria set by the Dairy Project authority and to have its recommendation before final consideration by the Bank.

### Special Credits: Milk Collection Operation

As proposed in the marketing component of the project, loans will be made available for Private Milk Collectors who are recommended by the manager of the Milk Plant, on the basis of a contract or proposed contract, to purchase new trucks and, if necessary, churns. (See Table 4.4.2). An additional 30 - 3 tonne trucks and approximately 60 - 30 litre churns will be required during the first five years of project life at total costs of US\$ 1.17 million and US\$ 10.0 thousand respectively.

### Machinery Services

As proposed in the description of the machinery services component of the project, private persons - farmers or other entrepreneurs - in the project area, would be contracted to supply machinery services to the farmers for land development, pasture establishment and maintenance.



#### 4.4.3.2 Input-Supply

The Project Authority must ensure that essential production inputs are available to farmers in adequate amounts at the times they are required and at reasonable cost. In collaboration with the Ministry of Agriculture, the Agricultural Bank and private sector manufacturers and/or importers, arrangements will be made for the supply of these inputs.

Probably the most critical inputs are concentrate feeds and supplements and veterinary drugs. The last should not be a problem as long as the importation and distribution remains in the hands of the Ministry of Agriculture and the necessary foreign exchange is provided from project funds through the Agricultural Bank. Vitamin and mineral supplements would be provided in similar fashion. In the case of concentrate feeds, however, the problem is complicated. Much of this type of feed should be provided as by-products of the rice and palm oil production. However, because the bulk of the rice crop is exported as whole grain "cargo rice", there is insufficient rice bran available locally to supply the needs of the livestock industry. Also the oil palm plantations are not expanding as was originally expected, so that no significant contribution of palm oil cake is anticipated.

It therefore appears that the most practical solution to the concentrate feed problem, in the short run, will be to import cheap feed materials in bulk to mix with such rice and palm oil by-products as are available.

It is to be hoped that early in the project life the Dairy Farmers Union Cooperative (See section 3.4.4) will be organized sufficiently to take over this problem of input supply. This cooperative would be the ideal body to take on the problem of the input supplies.



#### 4.4.3.3 Grass Multiplication Centre

The site suggested for the Grass Multiplication Centre is the State Livestock Farm. The soil in this location is sandy and the general drainage is very efficient so that all the proposed grass species will grow well there with the exception of Antelope grass (Echinochloa polystachia).

So that, for Antelope grass planting material, it is proposed that the Project Authority will arrange for contractors to collect planting material in the Weg naar Zee area where it is very plentiful.

For the pasture grasses the ideal planting material is stems with roots, so that regrowth for successive extraction of material takes at least four (4) months. For the cutting grass - Elephant grass (Pennisetum purpureum) - a three (3) month regrowth is necessary.

As planting is a seasonal practice there will be some surplus grass in the fields for part of the year which may be used for feeding State Farm livestock.

The total area of improved grass pasture to be planted by Year 2 of the project is:

#### Size Class

1.5 ha	82 ha
4.5 ha	744 ha
12.5 ha	564 ha
	-----
	<u>1390 ha</u>



Since roughly 20% of the farms are in lowlying areas and/or have soils with internal drainage problems which would be suited more to Antelope grass than the other types, to estimate the necessary output of the Grass Multiplication Centre these figures should be reduced by 20%, giving a total of around 1100 ha. Allowing for three extractions of plants per annum a nursery area of some 40 ha will be required of which 10 ha should be of Elephant grass.

The quantum of nursery for each type of pasture grass required is set as follows, on the basis of the experience and observation of Ministry of Agriculture technicians:

		<u>Allowing for</u> <u>seasonal drought</u>
<u>Brachiaria dicumbens</u>	45% = 13.5 ha	17.0 ha
<u>Brachiaria humidicola</u>	45% = 13.5 ha	17.0 ha
<u>Digitaria dicumbens</u>	10% = 3.0 ha	4.0 ha
	-----	-----
	30.0 ha	38.0 ha
+ Elephant Grass		
(P.purpureum)	= 10.0 ha	12.0 ha
	-----	-----
TOTAL	40.0 ha	50.0 ha

Because of seasonal climatic variations, regrowth is not always optimum and available quantities of planting material might not be sufficient. For this reason 25% more area will be planted than is required for the project implementation.

The establishment of the Grass Multiplication Centre is seen as an essential precursor to project implementation, for two reasons.





In the first place, grass for planting is the very first major input the farmers will require when they begin participation in the project and it will be necessary to have readily available, adequate quantities of high quality planting material. Secondly, planting material of good quality of all the recommended types, with the exception of Antelope grass, is already difficult to obtain, so that the Centre should start its' own nursery. All of which means that the Grass Multiplication Centre should already be operating when the project starts.

It is therefore recommended that the Ministry of Agriculture should establish the grass multiplication centre as soon as the project is approved and, if possible, 8-10 months before project implementation is due to begin.

However, the Dairy Project will take over all responsibilities of the grass multiplication centre as soon as the Project Management is in place and will continue its operation.

Surpluses of grass planting material will be available for farmers who while not participating in the project nevertheless desire to improve their pastures. From year 3 planting material can also be taken from farms participating in the project.

It is expected that the Project Administration will follow the Policy of requiring farmers to pay a fair price for all production inputs supplied by the project. Therefore there will be a minimum charge for grass planting material. The average production of grass is estimated to be  $1 \text{ kg/m}^2$ . For planting an area  $\frac{1}{10}$  of the area is required in planting material. Thus to plant one hectare of grass you need  $\frac{1}{10}$  ha ( $1000\text{m}^2$ ) of planting material which will be equal to one tonne.

The charge for the farmers participating in the project will be Sf50/ton. For those farmers outside the project wishing to buy planting material, the cover charge will be Sf75/ton.

The Antelope grass will be supplied by contractors who will receive Sf50 per tonne of planting material. This material then will be sold again to the farmers at cost.

At the end of year 7 there is no longer need for supply of planting material to the Farms in the Project Area.



#### 4.4.3.4 MACHINERY SERVICES

While the project needs to ensure that the farmers have ready and timely access to mechanical equipment for land development, pasture establishment and maintenance, it is strongly recommended that the traditional pool machinery services should be avoided. That particular system has usually proven both costly and inefficient. The preferred system would be based on that which has already had considerable success in the Rice Industry in Suriname.

In this system private persons, farmers or entrepreneurs in the project area, would be contracted by the project to supply the machinery services to farmers. The contractors would be granted loans and the necessary foreign exchange through the project credit line at the Agricultural Bank, to purchase a suitable tractor and all accessory equipment. The loan would be on the hire-purchase type of agreement which would allow the equipment to revert to the Bank in the event of default in payment or non-performance in contract. The particular farmers and/or entrepreneurs would be selected by tender. It is estimated that at least nine (9) such machinery service units would be required in the project area, six in the first year and all nine by year three.



#### 4.4.4 Technical Cooperation Component

This project component will be realized through a series of consultancies as follows:

Dairy Farm Management Specialist, for a period of 24 months, to assist the Project Manager and Project Implementation staff in setting up viable farm businesses.

Pasture Specialist, to manage the pasture improvement area of the project. For 24 months.

Milk Marketing Specialist, to set up, in collaboration with the Milk Processing Plant, an effective collection system in the project area, and to advise the Government in matters of milk industry policy. For 12 months.

Farmer Organization Specialist, to assist the Dairy Farmers Union in collaboration with the Project Administration and the Ministry of Agriculture to develop useful cooperative structures and actions to assist attainment of project objectives. For 12 months.

Credit Specialist, to assist the Agricultural Bank, its Credit Supervision and the Project Implementation Unit to develop and administer an effective and easily accessed credit programme for the small and medium-scale dairy farms. For 12 months.



## 4.5 Project Implementation

### 4.5.1 The Borrower

On completion of successful loan negotiation, the official borrower will be the Government of the Republic of Suriname, which will in turn create an independent body, a Project Authority (or Stichting or Foundation) to execute the project reporting to the Minister of Agriculture.

### 4.5.2 The Executing Agency

The executing agency will be the Suriname Dairy Authority (or Foundation) comprised of a Board of Directors and a Project Implementation Unit.

The Board of Directors would be the following.

1. A Chairman, appointed by Government (possibly from the Private Sector.
2. Director of the Ministry of Agriculture.
3. Sub-director, Ministry of Agriculture, Livestock Division
4. Sub-director, Ministry of Agriculture, Extension Division
5. Manager, Milk Centrale N.V.
6. Chairman, Dairy Farmers Union
7. Economic Analyst, Agricultural Bank, and
8. The Project Manager, who will serve as the non-voting Executive Secretary of the Board.





The Project Implementation Unit would consist of the following contracted personnel:

Project Manager.  
Three (3) Dairy Production Co-ordinators.  
Ten (10) Dairy Production Assistants.  
One (1) Administrative Officer  
One (1) Project Accountant  
Two (2) Secretary Typists  
One (1) Driver/Messenger

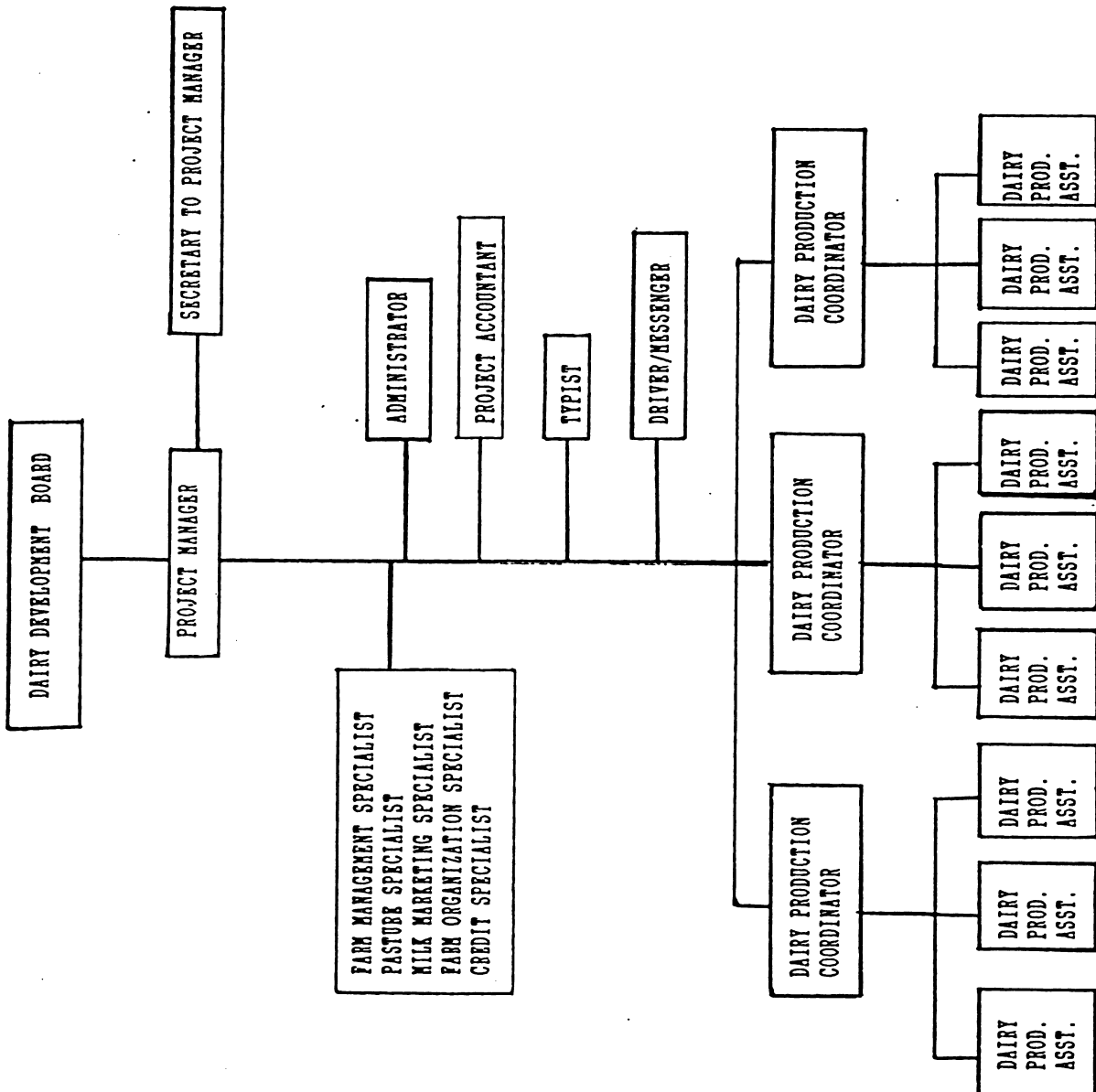
The position of Project Manager is, of course, critical to the success of the whole project and selection should therefore be made with the utmost care and deliberation.

A job description of the position is provided in Annex 4.5.2 (i), but in general terms, his/her function under the Board of Directors would be the day-to-day management of the project in accordance with the agreed implementation schedule and the coordination of the activities of the consultants and all institutions involved in the programme.

The Dairy Production Coordinates will be qualified and experienced Surinamese filling the description provided at Annex 4.5.2 (ii). Their main function would be to oversee the day-to-day field operations, particularly the work of the Dairy Production Assistants, and assist in the training both of the Dairy Production Assistants and of Farmers in all aspects of Dairy Farm Technology and Management. They will collaborate closely with the Ressortleiders in each Ressort.

The Dairy Production Assistants are the key extension personnel of the project. Five (5) of the ten (10) planned positions should be filled at the initiation of the project and these officers are to be trained in all aspects of Dairy Farm Technology and Management.







A formal Training Course will be organized by the Project for a group of 10-15 carefully selected trainees, in advance of recruitment, to allow second selection of the first five Production Assistants. The training of these five would continue in-service and on-the-job. A job description of the position of Dairy Production Assistant is provided at Annex 4.5.2 (iii).

A further five (5) Production Assistants will be recruited in year three of the project, in similar fashion to the first five. This build-up of the field staff is calculated in the following table to allow a lower farmer-extensionist contact ratio in the early years of the project.

Table 4.5.2

PROGRAMMED FARMER-EXTENSION CONTACT  
DURING IMPLEMENTATION OF DAIRY PRODUCTION PROJECT

<u>YEAR</u>	<u>NO OF FARMS</u>	<u>MAN OF EXTENSION TIME</u>	<u>NO FARMS PER EXTENSIONIST</u>	<u>CYCLE IN WEEKS #</u>
1	100-500	5	20-30	1.5 - 2.5
2	150-300	5	30-60	2.5 - 5.0
3	300-500	7.5	40-70*	3.0 - 5.5
4	500-700	10	50-70	4.0 - 5.5
5	700-900	10	70-90	5.5 - 7.0

\* 5 Recruited in mid-year.

# Average 12-14 farms/week



#### 4.5.3 Participating Institutions

##### 4.5.3.1 Ministry of Agriculture, Livestock and Fisheries

This project logically falls within the portfolio of the Minister of Agriculture, Livestock and Fisheries and specifically under the Livestock Division so that apart from a detailed involvement in the implementation of the project, it will be expected to provide technical guidance and direction to the Project Board and the Implementation Unit and serve also as a liaison between the Project and the Government and between the Project and the Farming Community.

In addition, the Ministry will be required:

- (i) to assist the Board in arranging for accommodation of the Project Implementation Unit and in the contracting of its' staff;
- (ii) immediately that the project has been approved for financing, to provide the land and facilities and to begin work on the grass multiplication centre (see 4.4.3.3 above);
- (iii) to arrange in due course to take over the transfer-of-technology function when the Project Implementation Unit is dismantled at the end of Year 5, including the extension staff (Dairy Production Coordinators and Assistants);
- (iv) similarly to continue to manage the grass multiplication centre from years 6 to 10;
- (v) similarly to continue to support the Pilot Demonstration Farms from years 6 - 10.





#### 4.5.3.2 Melk Centrale N.V.

The support and participation of the Milk Plant is intrinsic to this project. By the same token the project must provide the financial assistance the Plant requires in order to upgrade its processing capacity to take care of the increased production. An agro-industrial line of credit of just over US\$1 million is provided in the proposed project finance for this purpose.

In addition there must be a continuous dialogue between the Project Management and the Management of the Milk Plant to ensure the smooth development of Marketing process.

It is recommended that the Milk Plant should control all the Private Collectors and monitor their activities.

#### 4.5.3.3 The Agricultural Bank

As the farm credit component is the major component of this project and the key to farmer participation the Bank must be strongly supported by the Project Authority in terms of technical guidance and the monitoring of on-farm investment. One of its' most important functions would be to provide, through negotiation with the financing agency, the foreign exchange, required to import essential production inputs.

By year 2 the Bank should have four credit supervisors assigned primarily to dairy farmers in the project area, with transport vehicles supplied by the project authority. In year six the Bank will assume total responsibility for the dairy farm credit and collections and will take over the vehicles from the Project.

It has been estimated that the cost of administration of the farm credits would be about 13% (10% of approved loans and 3% of collections).



#### 4.5.3.4 Dairy Farmers Union

At the time of project preparation the Dairy Farmers Union (Now officially re-named "The Livestock Farmers Union") is an uncertain quantity (see 3.4.4 above). However one of the central objectives of the Project Administration, during the implementation phase, will be to provide the organizational guidance and training to enable this cooperative to take full charge and leadership - as opposed to the nominal position it now enjoys - of all aspects of the Dairy Industry:

- Input supplies
- Production
- Quality Control
- Collection and Processing
- Distribution

#### 4.5.3.5 The National Planning Office

Apart from its' usual role in the area of negotiation with possible development finance agencies, the Planbureau should be responsible for the on-going monitoring and evaluation of the project.



## V. PROJECT BENEFITS, COSTS, AND JUSTIFICATION

### 5.1 Economic Benefits

This project has three main tangible benefits:

- (i) A substantial increase in domestic milk production amounting to an additional 17 million litres by year 10 of the project (see Annex Table V.9.1) valued at over US\$12,7 million.
- (ii) A substantial increase in the supply of beef as a by-product of dairying and appreciable breeding stock for the concomittant expansion of the national dairy herd. The value of this additional production of animals will be over US\$8 million by year 10 of the project (Annex Table V.9.2)
- (iii) An improvement in the quality of milk delivered to the consumers due to improved dairy technology, including hygienic practices at the farm level, and an improved collection - processing system.

#### 5.1.1 Increased Milk Production

In computing the increase in milk production in the project area it has been conservatively estimated that in addition to the increases from the participating farms, another 20% will be produced as a result of the lateral impact on other farms in the area. The simple change from a once a day collection to twice a day will increase production for sale in the entire area well before the impact of improved dairy technologies will be realised.



For the purpose of this study raw milk was valued at Sf1.1.10 per litre rather than at Sf1.0.50 - the subsidized price. This is justified by the observation that the price paid directly by consumers already varies between Sf1.1.00 and Sf1.1.25.

#### 5.1.2 Increase Beef and Breeding Stock Production

The introduction of sound herd management and the increased use of artificial insemination results in a substantially greater by-product of culled cows, bulls and surplus heifer calves. These animals have been valued at the prices computed by project technicians (in Annex Table IV.2.6).

#### 5.1.3 Improved Milk Quality.

Current bacterial counts in milk are extremely high due to poor handling of milk. This high bacterial count leads to milk spoilage even when kept refrigerated at home after undergoing the pasteurization process.

It is estimated that this high degree of contamination accounts for at least 3% of total output of the milk centrale. The valuation of the reduction of the spoilage needs to be applied to the 6-7 million litres per annum currently delivered to the plant. Using the value computed for this project this quality improvement would reduce such losses by around US\$400 thousand annually.





## 5.2 Effect on Public Sector Finances

The project, given the current circumstances in terms of milk imports, subsidies and the state of the milk plant, may be expected to have a negative effect on public sector finances in the short run. It is estimated that for each litre of raw cows milk processed by the plant that a subsidy of Sfl.0.65 is required. (The farmer is paid 90ct, processing costs 25ct and the milk is sold at 50ct/litre retail). The whole marketing and pricing system requires careful analysis and review with the objective of reducing this short-run negative impact. If this is done, in the long-run the effect on public sector finances will be positive, particularly if one computes the shadow price of foreign exchange used to purchase milk powder. (see Chapter VI following).

## 5.3 Project Costs

The total incremental cost of the Project over the 15 years projection used in the primary design is estimated at US\$91.7 million most of which, some US\$83,7 million is incremental on-farm operating costs and investments (Annex Table V.10.1).

In terms of costs therefore, this project is relatively inexpensive when one considers the expected impact on the output of the Dairy Industry.



#### 5.4 Technical Feasibility

The Suriname Dairy Production Project is designed to maximize the excellent natural resources which the country possesses for such enterprise. In addition to good soils and well distributed and ample rainfall, the country has a good national herd of dairy animals based on the European Holstein - Freisan breeds crossed with hardy tropical cattle such as the Zebu and Sahiwal. Suriname has also inherited from Holland a sound basic tradition in dairy technology and in the mid-sixties was already producing over ten million litres of milk in the Middle Region alone.

The extreme range which can be found in production per cow and per hectare, and which can be traced to variations in management and simple technologies is a certain indication of the immense potential for increased production and productivity in the sector.

Further supportive evidence comes from recent experiences in neighbouring Guyana which whas a similar climate and soils but not the same quality in the national herd nor is there the "dairy technology traditions" referred to above. There it has been proven beyond doubt that simple improved technologies on small dairy farms coupled with sound management, can increase herd and per hectare production substantially.

The technology is available and can be carried effectively to the small farmers by this Project, which will also ensure the availability of essential inputs and an adequate marketing structure to deal with increased production.



## VI. PRECONDITIONING POLICY MEASURES.

The most important contribution required from the Government for the implementation of this project is not in cash nor in kind, but in the rationalization and adjustment of policies and policy measures which are required to prepare the climate for increased investment in and rapid growth of the dairy industry. The main areas are the following:

### 6.1 Price of Raw Milk

Much has been written and discussed concerning the price to farmers. In preparing the farm budgets for this project it appeared to be the case that the current price of Sf0.90 at the factory gate offers a fair return to the reasonably efficient farmer. But the problem of farmers price is distorted by several factors:

- (i) Milk production is very low per milking cow and per acre, and therefore cost-inefficient on the average, mainly due to inadequate nutrition and poor management.
- (ii) Important inputs, such as concentrate feeds, barbed wire, fertilizers and veterinary drugs, etc., are very difficult to obtain, and when available are prohibitively expensive (A 500 m. roll of barbed wire which cost Sf1 90 a few years ago now costs Sf1 400).
- (iii) Many farmers are selling the raw (i.e. unpasteurized) milk directly to consumers at Sf1 1.25 per litre because of the chronic shortage.



## 6.2 Price of Pasteurized Milk

The price of pasteurized milk has been fixed by statute at Sfl 0.45 per litre for well over ten years, during which time the price of most other consumer prices have increased several times over. While no hard statistics are available simple observation operation and sales personnel confirm, that most of the milk is purchased by the sector of the population that can most readily afford to pay more, in fact, who already pay Sfl 2.00 per litre for carbonated soft drinks.

This subsidy amounts to an enormous annual transfer payment to these groups and an untenable loss to Government at the Milk Plant.

## 6.3 Recommendations.

1. The law which prohibits the free sale of milk should be removed.
2. Simultaneously, there should be legislation introduced which would ensure that only wholesome milk i.e. of a certain minimum bacterial content and a minimum level of solids-not-fat, is sold to consumers.
3. Price controls, both for raw and for pasteurized milk, should be removed.





## VII. OUTSTANDING ISSUES AND RECOMMENDATIONS

### 7.1 Drainage of the Project Area

The main constraint to the agricultural development of the Middle Region of Suriname is the poor drainage of the Area.

In preparing this study the technicians involved were advised and could themselves observe that this was a problem that could only be partially solved at the farm level.

For this reason a proposal is made - attached to this main document - that steps should be taken in the very near future to prepare a plan for drainage of the entire area.

As may be readily appreciated, the work to be done is highly technical and concerns much more than dairy farm land. It cannot therefore be accommodated within the Dairy Production Project.



DEVELOPMENT OF A MASTER PLAN FOR  
DRAINAGE OF THE PARA-SARAMACCA-WANICA AREA

I. INTRODUCTION.

The Para-Saramacca-Wanica Area extends over some 100 thousand hectares which is currently only partially developed for agricultural production. It consists of Districts Wanica A, B, and C, the Eastern part of Saramacca and the Northern Section of Para.

The soils of the area belong to the complex called the Demerara formation. The landscape has a relative flat topography while the material has been deposited by fluvio-marine activities (van Amson, 1975). The area is dominated by the occurrence of very heavy clay soils, locally alternating with sand or shell bar complexes. The clay that originates from the Amazon estuary has a high chemical status but low lime content. It shrinks and swells tremendously. This combination of a flat topography and heavy clays result in very serious drainage problems over most of the the area.

Although in general the region has good potential for agricultural production drainage problems preclude the realization of this potential to its fullest capacity.

It has been roughly estimated that production could increase by, at least 50% if the water problem is solved.

Suriname has been working on the development of a Master Water Plan with the assistance of OAS <sup>1/</sup>. The master plan proposed is a comprehensive one that includes all aspects of water problem, but stays at a level of generality that does not address the problem from the point of view of agricultural use, nor does it propose specific actions at the field level.

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1/ Herreras, J.A., Mission Report on Integral development of water resources of Suriname, Conceptual Framework for the Elaboration of a Master Plan, OAS, Suriname, March 1984.



The IICA Office in Suriname, in collaboration with technicians of the Ministry of Agriculture have made an intensive study of the potential for dairy industry development in the area and all have agreed that the most severe constraint to agricultural development - not only for dairy but also for fruit, vegetables and ornamental horticulture - is this difficult drainage problem.

Several works have been done in the past in relation to the drainage problem, unfortunately most of it has not been maintained and for all practical purposes it has been lost.

## II. THE PROPOSED STUDY

The purpose of the proposed study is to prepare a comprehensive drainage plan for the entire region, which would include specific proposals in relation to

- rehabilitation of existing structures,
- construction of new drainage works, and
- future maintenance.



### III. JUSTIFICATION

The study is justified from both an economic and a social point of view.

From an economic point of view, it is expected that by solving the problem of drainage, production could be increased by 50%. This increase will be the result of two forces, on one hand an increase in the area under exploitation. Experts consulted estimate that the contribution of the first, without introducing any other change should account for an increase of production in the order of 10%. It should also be pointed out in this respect that improvement of drainage will allow also for the manifestation of other measures geared to productivity (changes in the production function), that otherwise would not occur. In other words it is a pre-requisite for an effective introduction of technological changes.

From a social point of view, the study is justified since Suriname has a high unemployment rate and there are no solutions in sight, in the short run, outside the agricultural sector. It is estimated that each new hectare that come into production can directly employ 4 persons/year, plus the multiplier effect that it would have, along with the increase in productivity of land, due to handling of more produce and the increment in income.









## EDITORIAL NOTE

This study was specially organized by IICA at the request of the Minister of Agriculture, Livestock and Fisheries. It has been financed by funds specially granted outside of the regular program budget by the Director General supplemented by local finance and contributions in kind from the Ministry of Agriculture.

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