

Developments in Surinam agriculture

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CONTENTS

	Page
<i>Summary</i>	254
1. <i>Introduction</i>	255
2. <i>The country, its population, soils and climate</i>	256
3. <i>Main features of Surinam agriculture</i>	
3.1. <i>Agriculture in nations economy</i>	257
3.2. <i>Land utilization</i>	257
3.3. <i>Farm types and farm sizes</i>	258
3.4. <i>Land tenure</i>	258
3.5. <i>Crops</i>	259
3.6. <i>Animal husbandry</i>	260
3.7. <i>Fisheries</i>	260
3.8. <i>Marketing and processing</i>	260
3.9. <i>Living conditions in rural areas</i>	261
4. <i>Development planning and programs</i>	
4.1. <i>Development planning</i>	261
4.2. <i>Development programs and investments</i>	262
4.3. <i>Policies and measures</i>	263
5. <i>Developments in agriculture, animal husbandry and fisheries</i>	
5.1. <i>Agricultural area and land reclamation</i>	264
5.2. <i>Production and consumption</i>	265
5.3. <i>Value of production and prices</i>	266
5.4. <i>Farmers income</i>	268
5.5. <i>Import and export</i>	269
5.6. <i>Animal husbandry</i>	270
5.7. <i>Fisheries</i>	271
5.8. <i>Other developments</i>	271
<i>Literature</i>	272

Summary

From the employment point of view, agriculture is the most important economic activity in Surinam. In 1959, of a total population of about 264.000 persons, 93.000 were living on farms, primarily situated in the young coastal plain. The majority of the working population is engaged

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DEVELOPMENTS IN SURINAM AGRICULTURE

in agriculture: of a total of about 70.000 workers, 40.000 found employment in agriculture and fisheries.

Whereas the possibilities for employment in the other economic sectors are limited and the growth of the population rates a high 4 % per year, development of the economy of Surinam requires strong efforts to develop Surinam agriculture.

In 1955 the Ten Year Plan, an overall economic development plan, was started. In the frame work of this plan a total amount of Sf 12,4 million has been invested in the agricultural sector during the years 1955 through 1960.

In 1959 a detailed agricultural development program was worked out for the period until 1965. The objectives and production targets of this development program were expected to be achieved primarily by an increase of the agricultural area (land reclamation and issue of new farms) and the introduction of new crops (especially bananas). Additional results were expected from measures improving farming methods and increasing yields per hectare.

Whereas land settlement in the low lying soils of the coastal plain requires empoldering, a major part of the available development funds were set aside for land reclamation purposes.

Recent developments in Surinam agriculture show that the production targets and other objectives of the agricultural development program can only be achieved by intensification of the land settlement program and a much stronger effort to introduce the banana cultivation.

In the period 1954 through 1960 agricultural production increased an average of 5 % per year. This increase was amply sufficient to keep pace with the growth of the population. It was, however, insufficient from a development point of view. Both expansion of the agricultural area and higher yields per hectare had an equal influence on the production increase.

Against a growing import of food in the above mentioned period, there was a relatively more important increase of the export of agricultural products. The trade balance of agricultural products has been improved.

Although insufficient data and figures are available to make an analysis of the other developments, there are indications that in the period 1954 through 1960 :

- the land settlement program did not provide enough additional employment,
- farmers' income has been rather stable,
- the diet of the population gained in animal protein.

Generally speaking, developments have been slow. One should however bear in mind that developments took place notwithstanding the fast growth of the population.

Moreover it took some years before governmental and private institutions organized themselves to such a level that they were able to carry out their tasks in the field of the planning and execution of development programs.

1. Introduction

The data and figures used in this article are mainly derived from the Second Agricultural Census, taken at the end of 1959. By making this census, Surinam participated in the "World Agricultural Census 1960", organized by the Food and Agriculture Organization of the United Nations. The results of this census have been published in "*Surinam in Figures*", No. 16, a publication prepared by the Ministry of Agriculture, Animal Husbandry and Fisheries in cooperation with the General Bureau of Statistics. This publication can be obtained from the Ministry of Agriculture, Animal Husbandry and Fisheries, Paramaribo, Surinam.

In this article only the developments in the sectors of agriculture, animal husbandry and fisheries are described. Unless stated otherwise, the word "agriculture" relates also to animal husbandry and fisheries. The activities and developments in the field of forestry have not been included.

2. The country, its population, soils and climate

Surinam, about five times as large as the Netherlands, is located on the north-east coast of South America, lying roughly between the 2° and 6° parallels North, and the 54° and 58° meridians West. It is bounded on the north by the Atlantic Ocean, on the east by French Guiana, on the south by Brazil and on the west by British Guiana (FIG. 1). Surinam has a coast line of about 345 kilometres and extends south to the Brazilian border to a depth of about 500 kilometres. It covers an area of approximately 143.000 square kilometres.

Its *population* is very small and amounted to about 264.000 in 1959 (excluding the Bushnegroes and Amer-indians living in the interior). About 40 % of the population resides in Paramaribo, the capital of Surinam. The rural population is concentrated around Paramaribo and in certain areas in the coastal plain of the districts (FIG. 2). The total population living on farms in 1959 was estimated at 93.000, of which 39.000 were working on the farms.

The population consists of different racial groups: Negroes and other black-coloured persons, Indians, Indonesians, Chinese, Europeans, Amerindians, Libanese, Jews etc. By Indians are meant persons immigrated from India and Pakistan and their progeny. Quantitatively the most important groups are the black-coloured persons, the Indians and Indonesians. The principal racial groups living in rural areas are the Indians (47 % of the rural population) and the Indonesians (26 %).

Topographically and pedologically, Surinam can be divided into four regions (FIG. 3).

a. The *young coastal plain* (geologically: Demerara formation) covers an area of about 17.000 square kilometres and forms a strip, 30 km wide on an average, along the Surinam coast of the Atlantic Ocean.

Eighty percent of the soil consists of a low level, heavy alluvial clay type (marsh and swamp). In several parts this clay zone is interspersed by series of low ridges consisting of sand and or shells and rising to a height of a few decimetres to a few metres above the level of the surrounding clay.

Most of the population lives in the young and old (see below) coastal plain. Most of the agricultural activities have taken place in the young coastal plain. The low level of the soils in this area has necessitated the use of dikes and sluices to keep out the sea water and drain the soil. The distinctive feature of Surinam agriculture is therefor its polder system (polders are areas enclosed by dikes from which water can be drained at low tide or, if complete water control is necessary, by means of pumping installations).

b. The *old coastal plain* (geologically: Coropina formation) stretches out over a width varying from 20 to 70 km south of the Demerara formation. It covers an area of 4000 square kilometres and consists mainly of complexes of sandy and silty sediments, separated from each other by low-level creeks and swamps. The sandy soils are predominantly dry; the silty ones predominantly marshy.

Only a very small part of the old coastal plain is under cultivation. The fertility of the different soiltypes varies greatly. The soils of the old coastal plain are generally spoken of a good physical structure, but of a chemically poor quality.

c. The *savannah belt* (geologically: Zandery formation) covers an area of 12.000 square kilometres. The coarse sandy soils vary in amount of clay and are of a poor structure and quality.

d. The *interior* or geologically the Guiana system, covers about six-sevenths of the

FIG. 1. Location of Surinam

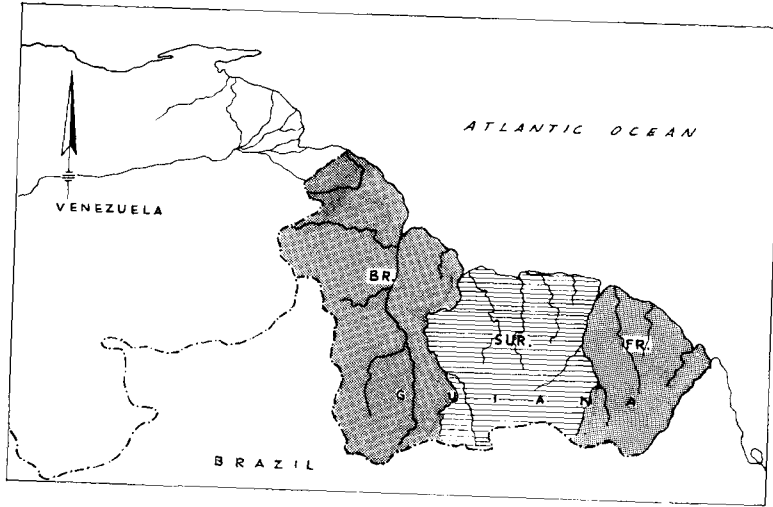


FIG. 2. Density of population

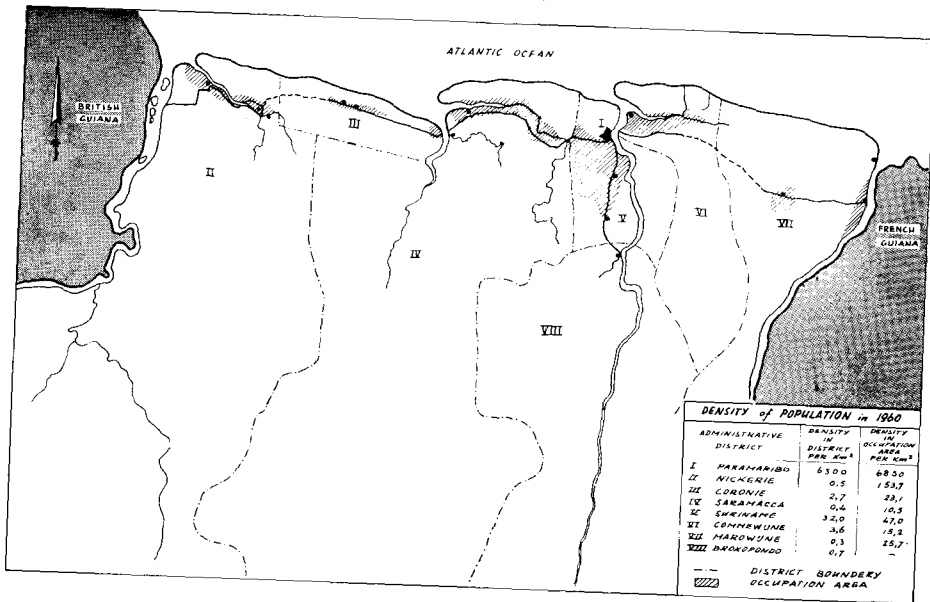


FIG. 3. Pedological regions

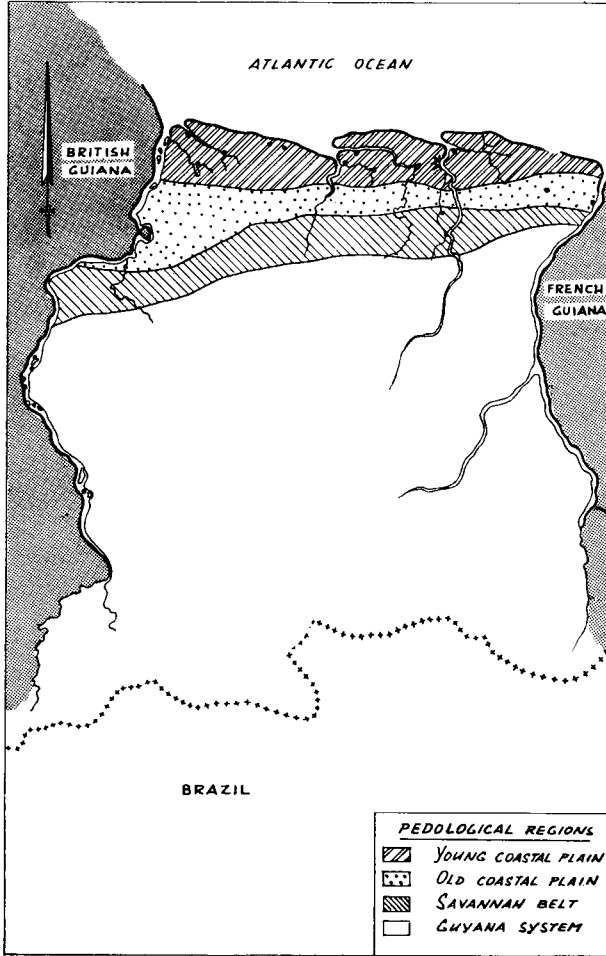
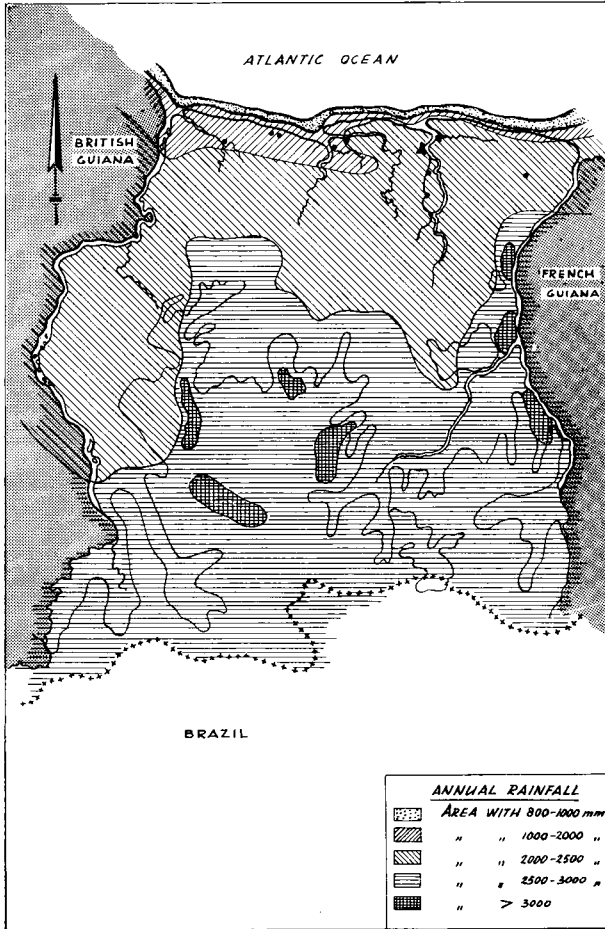


FIG. 4. Annual rainfall



surface of Surinam and consists of rock formations mostly of precambrium origin. The soils vary according to the rock formations. The suitability of these soils for agricultural purposes are being studied on a pilot project near Brokopondo.

Surinam has a tropical rain forest *climate*. It is humid but not unduly hot as the north-east trade wind is felt the entire year. In the coastal area the temperature varies from 73° to 88° F during the course of the day. The annual mean is 80,6° F at Paramaribo. The hottest month is September with 82° F. Night temperatures rarely fall below 70° F.

The mean annual rainfall is 2200 millimetres in Paramaribo and 1900—1950 mm in the western area (FIG. 4). The relative humidity averages 81 %. Surinam has no hurricanes and tornadoes.

3. Main features of Surinam agriculture

3.1. Agriculture in the nations economy

From the point of view of employment, agriculture is the most important economic activity in Surinam. In 1959 the total number of workers in agriculture and fisheries amounted to 39.730. Of these workers only 750 persons were engaged in fisheries; the rest, 38.980 workers, found employment in farming and consisted mainly of small-scale farmers and their wives. The total number of workers on small-scale farms amounted to 36.700 persons: 15.900 male workers and 20.800 women. The number of laborers on plantations amounted to 2.280 persons.

Against this number of about 40.000 workers in agriculture and fisheries stands the number of 30.000 persons employed in other economic sectors.

Surinams national product at present is mainly formed by mining, especially the mining of bauxite. Although in this sector a small number of workers is engaged, the gross domestic product of mining in 1959 amounted to Sf 55,0 million, which is about twice as large as the gross domestic product of agriculture and fisheries, namely Sf 21,0 million (see TABLE 1).

TABLE 1. Gross domestic product — 1959

Sector	Gross domestic product in Sf million	Percentage
Agriculture	19,2	11,6
Fisheries	1,8	1,1
Forestry	3,4	2,1
Mining	55,0	33,2
Industry	19,0	11,5
Trade and Transport	24,0	14,5
Services	14,0	8,4
Government	24,0	14,5
Houses	5,2	3,1
Total	165,6	100,0

3.2. Land utilization

As indicated by the 1959 census, only 5 % (105.800 hectares) of the total acreage of the coastal plains is in farms. Land suitable for agriculture in the coastal plains amounts to one million hectares. Of the 105.800 hectares in farms, only about 37.900 hectares are used for crops and 5.700 hectares for pasture (TABLE 2).

TABLE 2. Land use in Surinam — 1959 (in hectares)

	Young and old coastal plain	Savannah belt	Interior
Total acreage	2,100,000	1,200,000	11,000,000
Suitable for agriculture	1,100,000	100,000	5,000,000
Uncultivated farm area	60,500		
Land used for crops	37,900		
Land used for pasture	5,700		
Land used for yards	1,700		
Total farm area	105,800		
Area with paddy	26,800 ¹		
vegetables	500 ¹		
other annual crops	1,200 ¹		
sugar cane	1,400		
other biennial crops	1,200 ²		
tree crops	6,800		
pasture	5,700		
Total of arable and pasture land	43,600		

¹ Excluding second crops.

² Excluding catch crops.

3.3. Farm types and farm sizes

Plantation farming was the first type of agricultural undertaking developed in Surinam. In 1785 591 plantations were in operation. The regression in plantation farming started at the beginning of the 19th century and lasted till the end of World War II. After this war rehabilitation of some plantations took place and a new large, highly mechanized rice-farm was established. At the end of 1959 about 35 plantations had an area of 12,800 hectares in cultivation. The main crops are rice, sugar, oranges, grapefruit, coffee and cacao. At the end of 1959 2280 laborers were employed by the plantations.

The majority of the rural population finds a living in *small-scale farming*. According to the census taken in 1959, the area under cultivation on the 16,200 small and medium sized holdings amounted to 32,500 ha. The size of the holdings varies considerably, the smallest being found among the Indonesians, the larger ones among the Indian farmers. The small-scale farmers often rely for their subsistence on what they produce. Many farmers do not depend entirely on their holdings but derive part of their income from fishing, work on plantations, government employment or other sources. The main crop is rice.

The size of the holdings in the various agricultural areas varies with the different major crops. In the rice areas, holdings are relatively small, in the coffee, citrus and cacao areas rather large holdings (plantations) are found (see TABLE 3).

3.4. Land tenure

The oldest and commonest form of land tenure in Surinam is the so called "allodial eigendom en erfelijk bezit", a right which can be considered as full ownership. Almost all the plantations obtained their land under this title. During the last seventy-five years, the period in which small-scale farming developed, other land rights were given. The most important rights (see TABLE 4) are:

DEVELOPMENTS IN SURINAM AGRICULTURE

- long lease from government for 75 years ;
- lease (rent) from government in land settlements ;
- lease (rent) from government outside land settlements ;
- occupancy (use) of government land in and outside settlements ;
- lease (rent) from village communities, which obtained the land from the government under a long lease title ;
- lease (rent) from private persons.

A law exists to safeguard farmers who rent land from private persons. In most cases the farm operator pays the landowner a certain amount of money per hectare. In some instances for the land is paid with part of the crop.

TABLE 3. Farm sizes and area; land in use — 1959

Size of farms in ha	Number of farms		Farm area (ha)		Land in use ¹	
	total	%	total	average	ha	% of total farm area
< 0,48	1.144	7,0	345	0,3	295	85,5
0,48—1	2.061	12,7	1.465	0,7	1.125	76,8
1—2	4.431	27,3	6.133	1,4	4.315	70,4
2—3	2.557	15,7	5.933	2,3	3.662	61,7
3—4	1.861	11,5	6.158	3,3	3.557	57,8
4—5	1.131	7,0	4.861	4,3	2.891	59,5
5—7	1.149	7,1	6.611	5,8	3.751	56,7
7—20	1.505	9,3	15.433	10,3	8.022	52,0
> 20	365	2,2	21.845	59,8	4.925	22,5
Total small-scale farming	16.204	99,8	68.784	4,2	32.543	47,3
Plantations	35	0,2	37.048	1058,5	12.788	34,5
Total	16.239	100,0	105.832	6,5	45.331	42,8

¹ Inclusive farm yards.

TABLE 4. Number and area of farms by tenure — 1959

	Holdings with one title		Holdings with more than one title		Total area (ha)
	number	area (ha)	number	area (ha)	
Owned by holder	2.676	35.089	—	14.751	49.840
Long lease from government	283	12.789	—	6.435	19.224
Rent from government	6.172	15.348	—	7.632	22.980
Rent from private persons	2.306	4.147	—	3.035	7.182
Other title	1.723	3.677	—	2.929	6.606
Total	13.160	71.050	3.071	34.782	105.832

3.5. Crops

The main crops cultivated by the plantations are citrus, coffee, cacao, sugarcane and rice. In the cultivation of citrus, coffee and cacao mechanization is practically impossible by reason of the necessary polder system with the trees planted on narrow beds. The sugarcane and rice cultivation on plantations are mechanized to a considerable extent.

The small farms are for the greater part family sized. The main crop, rice, is planted once a year, and after rice sometimes pulses or corn are grown. On most of the farms, rice is followed by a period of wet fallow. Many rice farms are plowed with tractors. Mechanization of the harvest and threshing of paddy is being gradually introduced. For figures on area and production of the main crops, see APPENDIX 1.

3.6. Animal husbandry

The cattle in Surinam consist of mostly native herds (creole), although in the later years European and Zebu cattle were imported. A program for artificial insemination has been started years ago and now many cattle are found half or three quarters Dutch Frisian Holstein. The beef weight of the local cattle is about 150 kg, the milk yield about 2—3 liters a day. However, proper care and good feeding increase milk production even of the local cattle considerably. A production of two to three thousand litres per lactation period is obtained on the better dairy farms. For figures on number of cattle, pigs and poultry, see TABLE 20.

3.7. Fisheries

The Surinam fishing industry is in a transitory stage. On the one hand one finds the old traditional ways of fishing along the coast and in the rivers, on the other hand, of rather recent date, the modern type of trawl fishing for shrimps and fish. The traditional system is responsible for the catch in Surinam waters and for the main part supplies the local market.

It is estimated that about 750 fishermen deliver about 3.000 tons of fish to the markets annually. Another 600 tons are caught for direct consumption by farmers and others in the rivers, ponds and canals to their homes.

The main types of fishing are :

- a. fresh water fishing : river fishing, swamp and creek fishing and fish cultivation in fresh water ponds ;
- b. brackish water fishing : river mouth fishing, fishing in brackish water swamps and fish cultivation in brackish water ponds ;
- c. sea fishing ; such as bank fishing and trawl fishing.

For figures on fish- and shrimp production, see TABLE 23. Figures on number of fishermen and boats are presented in TABLE 24.

3.8. Marketing and processing

The *marketing* of agricultural produce is not sufficiently organized. The result is that the producers earn less than they should and the consumers pay too much for food. There are no wholesale markets in the proper sense of the word. Often the growers themselves bring the produce (vegetables, fruits, fish) to markets (open air) in town. The meat arrives as livestock, is slaughtered in government slaughter houses and sold by butchers in retail shops. Until 1961 milk was distributed directly to the consumers, each farmer or middlemen carrying a few liters for a few customers. Since 1961 however a modern dairy plant is in operation.

Because of the small size of the local market, the industrial development of the country has necessarily been confined to small factories producing for domestic consumption or to industries producing primarily for export.

The major activity in the field of *agricultural processing* is rice milling (\pm 200 rice mills). There are some modern large rice mills (for export), the majority, however,

are small. Other agricultural industries are a.o. : a brewery, two coconut-oil factories, one tobacco industry, two sugar factories, two dairy plants, a shrimp packing plant, a citrus packing plant etc.

3.9. Living conditions in rural areas

Although in recent years much has been done to improve the living conditions in rural areas, the situations in the districts are, generally speaking, still worse than in the capital Paramaribo.

The *housing* situation in rural areas has been studied in 1959 by a Rural Housing Committee. The report of this Committee indicates that the construction of the houses in rural areas is still of a low quality. Whereas 90 % of the houses in Paramaribo have a roof, floor and walls of reasonably good material, in the districts only 50—54 % of the houses are of fairly good construction (1950 figures). The average number of persons living in one house is 4,6 (districts : 4,5 persons ; Paramaribo : 4,6 persons). The major part of the houses in the districts do not meet the minimum requirements of space.

In recent years there has been a significant improvement in housing in rural areas, especially in the new land settlements, where farmers obtained supervised credit for building adequate farm houses. In the existing agricultural areas the housing situation has also been improved. The Rural Housing Committee recommended a housing program for rural areas of about 750 new farm houses per year.

The supply of *electric energy* to the rural areas has also lagged behind. Recently a number of power stations have been built, through which it was possible to make electricity available to a number of rural homes in and around villages. The majority of the farmers homes, however, are still without electric energy. The program for electrification of rural districts will be extended.

With regard to the *water supply* most of the rural families still obtain water from streams, canals, surface wells and other sources open to contamination. Especially during the dry season in many areas the water supply becomes a serious problem. In recent years several drillings were carried out and some with success. In some parts of the districts, however, it is very difficult to provide for these facilities because of the many scattered farms. Although in some cases wells can be established, for most of the farms the only answer seems rainwater tanks. Several hundred wells have been built with the help of the government.

Many *tropical diseases* as smallpox, cholera, typhus and sleeping sickness are absent in Surinam. The incidence of typhoid fever, paratyphoid fever, bacillary and amoebic dysentery is low as compared with other tropical countries. In rural areas yaws, trachoma, schistosomiasis mansoni, filariasis and anchylostomias (hookworm) are prevalent. In the coastal region malaria is decreasing steadily. In recent years several new polyclinics have been established in the districts ; in two of the districts new hospitals have been built. Against schistosomiasis, hookworm, filariasis and malaria, campaigns are held regularly.

4. Development planning and programs

4.1. Development planning

In 1955 an overall economic development plan, the so called Ten Year Plan, was started.

It has however taken some years to acquire a reasonably clear picture of the develop-

ment possibilities. Much preliminary work in technical, economic and social fields had to be done before acceptable development programs could be drafted and executed. Nevertheless since 1955 much progress has been made in the further planning and execution of development programs, especially in the field of agriculture, animal husbandry and fisheries. In 1959 a complete and detailed agricultural development program was worked out for the period until 1965¹. This program had a considerable influence on the policy and activities of the government.

Based on the general aims of the overall development plan, the objectives of the development program for agriculture, animal husbandry and fisheries were formulated as follows :

- increase of production to such an extent, that the need for food of the fast growing population can be met, its diet can be improved and part of the import can be replaced by local products ;
- increase of production of export commodities in order to improve the trade balance ;
- improvement of the income of the farmers ;
- creation of employment in the agrarian sector in such a way, that the increase of the agrarian working population can be gainfully employed in this sector.

Taking into consideration the above mentioned objectives and the present agricultural situation, production targets were established for 1965. The targets were calculated on base of the increase of the population, the possible replacement of import products, a moderate change in the composition of the diet and the required export.

In order to realize the objectives of the agricultural development program and to reach the production targets, a considerable expansion and reorientation of the agricultural production is required. This is expected to be achieved by an increase of the agricultural area (land reclamation and issue of new farms), an increase in yields per hectare or per unit of livestock (improvement of farm methods) and the introduction of new crops (especially bananas for export).

Part of the increase in arable land should come from improving existing, old agricultural areas, but most of the increase should be effected by establishing new polders and the issuing of new farm lands. Land settlement in the low lying soils of the coastal plain is very costly, whereas it requires high expenditures for the establishment of new polders. Nevertheless land reclamation is a necessity with respect to the important objective of creating enough employment for the increase of the working population.

4.2. Development programs and investments

To obtain the production goals and achieve the objectives of the agricultural development plan, several programs and measures are necessary. The programs mentioned in the 1959 plan relate to the following subjects :

- Inventories (soil examination, agricultural census) ;
- Research in the field of :
 - production (varieties, diseases, use of fertilizers etc.),
 - mechanization,
 - technology,
 - marketing.

¹ A revision of the development program of 1959 is now being prepared.

DEVELOPMENTS IN SURINAM AGRICULTURE

- Land reclamation and land-settlement administration ;
- Agricultural credit ;
- Agricultural extension ;
- Agricultural education (agr. schools, courses, school farms) ;
- Animal husbandry :
 - livestock research and breeding,
 - veterinary research,
 - slaughterhouses and training of butchers.
- Fisheries :
 - research in sea fishing, fish cultivation and processing,
 - marketing.
- Storage, processing and market provisions ;
- Price regulation and commerce.

The investments made in the frame work of the Ten Year Plan and the Government expenditures for the development of the agricultural sector are indicated in TABLE 5.

TABLE 5. Investments and expenditures for agricultural development in Sf million — 1955/60

	1955	1956	1957	1958	1959	1960
Gross value of agric. production ..	18,81	19,52	20,03	25,25	25,42	24,34
Ten-Year-Plan investments	0,66	0,97	1,52	2,13	3,11	4,00
Government expenditures	2,00 ¹	2,11	2,37	2,91	3,25	3,21

¹ Estimate.

The total "development" costs for the five year period 1960—1965 are estimated at Sf 33,1 million. The estimated government budget for agriculture (including animal husbandry) and fisheries for the same period is Sf 21,5 million (Since the 1959 plan will be revised, these figures probably will be changed).

4.3. Policies and measures

It is understood that without certain economic measures it will be very difficult to lead agricultural production in the desired direction.

It is not enough to enable the farmer to produce through making land available, distributing planting materials and furnishing credit, but it is also necessary to assure farmers that they can sell their products at reasonable prices.

The government must assist the farmers in maintaining fair prices and at the same time keep in mind the consumers interests in low priced, local food. A law giving the government the necessary power and means to support and *stabilize farm prices* is now under consideration by the legislative council.

A certain replacement of imported food by local products is possible, but hardly to be achieved without some *import restrictions*. Certain measures in this field were taken and others proposed.

A number of laws are passed or pending to foster development in general and which are also of great importance for agricultural development. Worth mentioning are a land law, a law on cooperative societies, a law regarding investments and tax facilities, a price-stabilization law, etc.

5. Developments in agriculture, animal husbandry and fisheries

5.1. Agricultural area and land reclamation

The *agricultural area* (arable land, pasture and yards) increased from 38.100 ha in 1954 to 45.700 ha in 1960 (TABLE 6).

TABLE 6. Agricultural area — 1964/60

Year	Total (ha)	Index (1954/1957 = 100)	Small-scale farming (ha)	Plantations (ha)
1954	38.130	96,0	—	—
1955	36.501	91,8	—	—
1956	40.172	101,1	—	—
1957	44.162	111,1	—	—
1958	46.601	117,3	33.918	12.683
1959	45.331	114,1	32.543	12.788
1960	45.701	115,0	33.090	12.611

The increase of the agricultural area (15 % in five years) is mainly a result of the taking into cultivation of recently reclaimed land. The increase of the agricultural area in the years 1956 and 1957 was caused by the establishment of the large mechanized rice farm "Wageningen". The increase in 1958 by a temporary occupation of uncultivated farm lands in the old agricultural areas, and the increase in 1959 and 1960, as compared with 1957, by the cultivation of farm lands in two new polders.

The total increase of the agricultural area in the period 1954 through 1960 amounted to about 7500 ha. The increase of the area in use in land reclamation projects was in the same period about 9000 ha (TABLE 7). For a list of the different projects see APPENDIX 2.

TABLE 7. Increase of agricultural area — 1954/60 (in hectares)

Year	Total	Land-reclamation projects	Outside land- reclamation projects
1954	—	—	—
1955	— 1.629	1.700	— 3.329
1956	3.671	2.220	1.451
1957	3.990	2.023	1.967
1958	2.439	462	1.977
1959	— 1.270	2.137	— 3.407
1960	370	427	— 57
Total	7.571	8.969	— 1.598

In the period 1954 through 1960, 1545 plots were issued to small scale farmers in settlement projects. This gives an average of about 220 new farms per year. To fulfill the employment objective, a required number of 600 new farms per year was mentioned in the development program of 1959. The land settlement program had lagged behind (TABLE 8). Therefore, in 1961, establishment of new polders and the issuing of farms have been intensified.

TABLE 8. Issuing of new farms — 1954/62

Period	Number of farms issued	Gross acreage (ha)
1954—1958	1.270	6.673
1959	175	965
1960	100	484
1961	360	1.500
1962	500 ¹	2.600

¹ To be issued.

5.2. Production and consumption

In the period 1954 through 1960 the *agricultural production* has been increased with an average of 5 % per year (see also APPENDIX 1). Compared with the estimated growth of the population of about 4 % per year, this figure shows that the increase of agricultural production was amply sufficient to keep pace with the growth of the population. It was, however, insufficient from the development point of view. In the production plan of 1959 a required increase of about 9—10 % per year was mentioned for the period 1959—1965.

In TABLE 9 the influence of the severe drought in 1957 on the production is clearly shown. The important increase of the production in 1958 was mainly caused by a temporary expansion of the cultivated area. The bad results in 1957 stimulated the farmers to use also a part of their normally uncultivated farm land.

TABLE 9. Production index numbers (1954/1957 = 100)

	1954	1955	1956	1957	1958	1959	1960
Agriculture	100,2	100,8	104,3	94,7	119,2	121,6	126,0
Animal husbandry	96,2	98,0	100,4	105,4	121,9	128,1	138,1
Fisheries	70,3	100,3	132,5	91,9	139,1	142,2	152,5
Total	97,9	100,2	105,2	96,8	121,1	124,3	130,3
Yearly increase in %	—	2,8	2,2	—8,0	25,0	2,6	4,8

The increase of the production in the sectors agriculture and animal husbandry (thus excluding fisheries) has not only been effectuated by the expansion of the cultivated area, but also by the fact that, on an average, higher yields per area or livestock unit were obtained. As shown by TABLE 10, both, expansion of the agricultural area and higher yields per unit, had an important and equal influence on the production. In the years until 1959 the production increase was mainly caused by expansion of the agricultural area, in the years 1959 and 1960 by higher yields.

TABLE 10. Index numbers of production, area and yields (1954/1957 = 100)

	1954	1955	1956	1957	1958	1959	1960
Production of agriculture and animal husbandry	99,3	100,2	103,4	96,5	119,9	123,1	128,8
Agricultural area	96,0	91,8	101,1	111,1	117,3	114,1	115,0
Yields per unit	103,4	109,2	102,3	86,9	102,2	107,9	111,3

The relations between the growth of the population, the production, the agricultural area and the average yields are illustrated by FIG. 5.

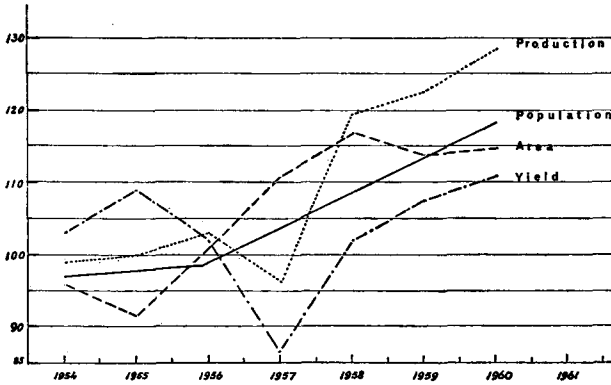


FIG. 5. Index numbers of the population and of agricultural area and yields (1954/1957 = 100)

The question whether the increase of production also resulted in a better *supply of food* and improvement of the *diet of the population*, can not be answered. At the time of writing this article a food balance sheet only for 1959 was available, which gives an impression of the general situation in that year, but, of course not of the changes that took place in the course of the years. To study the nutritional status of the population and advise the government on policies and programs on nutrition and food supply, a Nutrition Council has recently been established.

There are however indications that the diet of the people has been improved. The production (and most probably also the consumption) of protective food (milk, meat, eggs and fish) has been increased to a much greater extent than the population.

From the food balance sheet for 1959 the following per caput consumptions are shown :

calories per day	:	1928	
protein per day			
animal protein	:	15,5 g	
vegetable protein	:	28,2 g	43,7 g
fat per day	:		45,4 g

Whereas these figures are averages for all population groups, it is evident that a further increase in the consumption of protein rich food is highly desirable.

5.3. Value of production and prices

The *gross value of the production* of the sectors agriculture, animal husbandry and fisheries increased from Sf 17 million in 1954 to Sf 25 million in 1959/1960, i.e. Sf 8 million over a period of six years (TABLE 11).

TABLE 11. Gross value of the production of agriculture, animal husbandry and fisheries in Sf million — 1954/60

	1954	1955	1956	1957	1958	1959	1960
Agriculture	12,51	14,01	14,44	15,26	18,73	18,22	16,35
of which small-scale farming		not available			11,89	10,78	8,44
Animal husbandry	3,61	3,70	3,76	3,84	4,55	5,02	5,43
Fisheries	0,83	1,10	1,32	0,93	1,97	2,18	2,56
Total	16,95	18,81	19,52	20,03	25,25	25,42	24,34
of which small-scale farming		not available			18,41	17,98	16,43

DEVELOPMENTS IN SURINAM AGRICULTURE

The increase of the production value was irregular. The pronounced increase in 1958 was mainly caused by the reactions of the farmers and the local market on the low yields and scant supplies in 1957 (drought). The 1958 production was considerably higher than in former years, while the prices, strongly increased by the crop failures in 1957, kept themselves on the same high level in 1958. In TABLE 12 the index numbers of the production value are shown.

TABLE 12. Index numbers of the gross value of production (1954/1957 = 100)

	1954	1955	1956	1957	1958	1959	1960
Agriculture	89,0	99,7	102,7	108,6	133,3	129,6	116,3
Animal husbandry	96,8	99,3	100,9	103,0	122,1	134,7	145,7
Fisheries	79,4	105,3	126,3	89,0	188,5	208,6	245,0
Total	90,0	99,9	103,7	106,4	134,1	135,0	129,3

Over the period under report, on the whole, the *prices of agricultural products* (incl. fisheries) did not increase. A temporary rise however occurred in 1957; in 1959 and 1960 prices fell again to the 1955/1956 level.

The *prices of locally produced food* showed a regular increase. In the period under report these prices have risen 38 %. From a comparison between the production and food prices (TABLE 13 and 14), it can be concluded that, on the whole, the farmer did not profit by the increase of food prices. Only in 1957 and 1958 did the farmer receive higher prices for his products. This, however, compensated only the low yields in 1957 (TABLE 14).

TABLE 13. Index numbers of prices of agricultural products, incl. fisheries 1954/1957 = 100)

	1954	1955	1956	1957	1958	1959	1960
Total agriculture, animal husbandry and fisheries	92,4	99,7	98,6	109,9	110,7	108,6	99,2

TABLE 14. Index numbers of prices of cost of living (3rd quarter 1953 = 100)

	1954	1955	1956	1957	1958	1959	1960
Total goods	102	103	105	114	113	114	117
Locally produced food	103	108	114	125	131	134	138

FIG. 6 illustrates the relations between production, prices and production value.

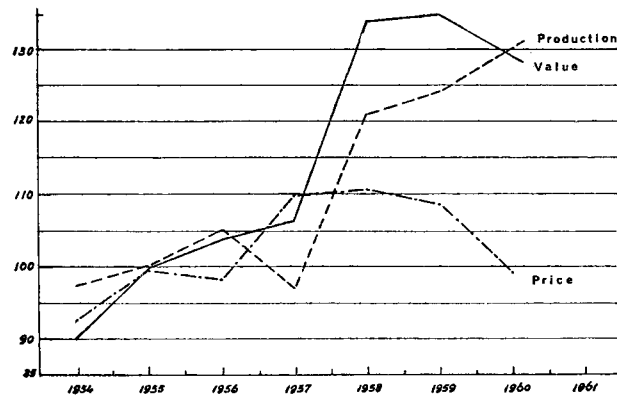


FIG. 6. Index numbers of production, value of production and prices (1954/1957 = 100)

5.4. Farmers income

The question whether the income of the farmers has been improved can not be answered. Reliable figures about changes in the number of farms and workers during the past years are not available. The Second Agricultural Census gives figures for 1959 only. From this the data in TABLE 15 can be derived.

TABLE 15. Value of production per farm and worker in agriculture — 1959

	Small-scale farming	Plantations	Total
Gross value of agric. production (incl. animal husbandry, excl. fisheries)	15.809	7.443	23.252
Number of farms	16.204	35	16.239
Av. value of production per farm in Sf	975	212.700	1.430
Number of workers	36.699	2.277	38.976
Av. value of production per worker	430	3.300	600

The average gross value of the production of the small-scale farms gives an impression of the level of the annual income of the farm families. This amounted to Sf 975.— per year. The average net income of the farm families will be only slightly lower. The production costs on the majority of the small farms are low and negligible: only a few farms are mechanized and labor is mainly provided by the farmers themselves.

The majority of the small-scale farmers, however, received a much lower income from their farms than the average of Sf 975.— per year: 63 % of the holders with farms of 3 hectares or less, received an income of only Sf 530.— per year. Using this figure one should, however, bear in mind that part of the holders of these small farms do not consider their farm as the main source of living (TABLE 16).

TABLE 16. Gross value of production per farm by farm sizes — 1959

Farm sizes (ha)	Number of farms		Gross value of production	
	total	%	total (Sf 1000)	per farm (Sf)
< 0,48	1.144	7,0	285	249
0,48—1	2.061	12,7	742	360
1—2	4.431	27,4	2.461	555
2—3	2.557	15,8	2.024	792
3—4	1.861	11,5	1.842	990
4—5	1.131	7,0	1.452	1.284
5—7	1.149	7,1	1.835	1.597
7—20	1.505	9,3	3.629	2.411
> 20, small-scale farming	365	2,2	1.539	4.217
Total small-scale farming	16.204	100,0	15.809	975
> 20, plantations	35	—	7.443	212.657
Total	16.239	—	23.252	1.432

According to the figures of the preliminary report of the "Census of industries and occupations-1961", the average yearly wage of persons employed in non-agrarian enterprises amounted to Sf 2034,— per person. Compared with the average yearly

DEVELOPMENTS IN SURINAM AGRICULTURE

income of farmers of Sf 975,— per family and taking into account that the majority of the farmers have a much lower income, one sees an important reason for the still strong tendency of the rural population to migrate to town.

5.5. Import and export

The import and export of agricultural products increased as is shown in TABLE 17.

TABLE 17. Import and export of agricultural products — 1954/60

	Value in Sf 1000		Percentage of covering	Index numbers (1954/1957 = 100)	
	Import ¹	Export		Import	Export
1954	9.899	3.783	38,2	94,6	81,8
1955	9.995	4.227	42,7	94,5	91,5
1956	10.546	5.472	51,9	100,7	118,4
1957	11.531	5.007	43,4	110,2	108,3
1958	11.891	5.806	48,8	113,6	125,6
1959	13.026	8.022	61,6	124,6	173,5
1960	14.515	8.008	55,2	138,7	173,3

¹ Mainly food.

The import prices for food remained fairly stable. The increase in the import value, therefore, has been caused mainly by a greater volume of high-priced imported food. The reason for this is probably the increasing purchasing power of the population effectuated by the execution of different development plans and foreign investments.

TABLE 18 shows the import value of the different types of food. Against the growing import of food stands a relative more important increase of the export of agricultural products. The trade balance of agricultural products, therefore, has been improved. In TABLE 19 the export value of the most important products are shown.

TABLE 18. Import value of most important food products in Sf 1000 — 1954/60

	1954	1955	1956	1957	1958	1959	1960
Meat and meat products	1.131	1.184	1.254	1.302	1.506	1.638	1.896
Dairy products and eggs	1.216	1.066	1.392	1.340	1.143	1.729	2.011
Fish and fish products	730	811	800	968	1.007	1.084	1.171
Grains and grain products	2.254	2.168	2.673	2.757	3.009	2.564	2.771
Sugar and sugar products	191	183	239	185	244	324	404
Fruit and vegetables	1.356	1.356	1.525	1.460	1.610	1.679	1.934
Coffee, tea, cocoa and spices	818	823	846	817	823	945	897
Other products	750	797	922	937	1.163	1.254	1.658
Total food import	8.446	8.388	9.651	9.766	10.505	11.217	12.742

TABLE 19. Export value of the most important agricultural products in Sf 1000 — 1954/60

	1954	1955	1956	1957	1958	1959	1960
Shrimps	12	26	136	72	153	508	512
Rice	1.864	2.798	3.428	2.728	3.684	4.254	4.872
Sugar	84	—	182	345	121	369	689
Cocoa	81	63	102	185	173	305	321
Coffee	828	802	596	693	516	871	254
Citrus	550	336	771	665	862	1.454	1.049
Coconuts	243	53	76	103	80	29	36
Other products ..	121	149	181	216	217	232	272
Total	3.783	4.227	5.472	5.007	5.806	8.022	8.005

5.6. Animal husbandry

See also paragraph 3.6. The development in the sector of animal husbandry can be illustrated by the figures about the number of cattle, pigs and poultry, and the number and weight of slaughterings. TABLE 20 shows the increase in livestock.

TABLE 20. Number of cattle, pigs and poultry in 1000 head — 1956/60

	1956	1957	1958	1959	1960
Cows	11,7	14,2	14,2	14,4	15,3
Bulls and oxen	11,2	11,3	9,6	12,1	11,5
Young cattle	7,6	8,7	9,0	8,6	9,3
Buffaloes	0,2	0,2	0,1	0,2	0,1
Total cattle	30,7	34,4	32,9	35,3	36,2
Chickens	227	225	250	261	311
Other poultry	31	25	22	29	39
Total poultry	258	250	272	290	350
Pigs	6,7	5,2	4,7	6,0	7,7

The number of cattle has increased slowly. Reliable figures about the development of the milk production in the years before 1961 are not available. The slow increase in the number of cows and the fact that in the past years not much has been done by the farmers to improve the pastures and the feeding of cattle, leads to the conclusion that milk production in the past has been rather stable. It is expected, however, that the establishment of the new dairy plant (1961) will affect the dairy industry considerably.

Meat production has also been increased. The total slaughtered weight in Paramaribo increased about 35 % in five years: about 15 % more than the growth of the population in the same period.

The difficulties encountered by the farmers in marketing their milk were the main reason for the strong increase in slaughterings. This can be illustrated by the figures in TABLE 21 of slaughterings in the slaughter house of Paramaribo.

Besides intensive research (grasses, feeding, breeding) and extension, artificial insemination contributed to the improvement of the local herd.

TABLE 21. Slaughterings in Paramaribo — 1954/60

Year	Cattle			Pigs			Total slaughter weight ¹	
	Number of slaughterings	Slaughter weight		Number of slaughterings	Slaughter weight		In 1000 kg	Index numbers ²
		total (1000 kg)	av. p. head (kg)		total (1000 kg)	av. p. head (kg)		
1954	3.713	436	117	2.860	160	56	596	91
1955	3.932	451	115	3.283	173	52	625	95
1956	4.243	495	117	3.278	185	56	682	104
1957	4.510	529	117	3.905	194	50	725	110
1958	4.332	567	131	3.816	174	46	744	113
1959	5.045	700	139	3.107	154	50	858	130
1960	5.800	707	122	2.893	181	63	891	135

¹ Including sheep and goats.

² (1954/1957 = 100).

Whereas artificial insemination raised the percentage of Frisian Holstein considerably and in some instances to a dangerous level, inseminations with half blood Frisian Holstein are increasing (TABLE 22).

TABLE 22. Number of artificial inseminations — 1956/60

	1956	1957	1958	1959	1960
First inseminations	2.141	2.259	3.213	2.997	3.556
Total inseminations, of which	3.111	3.076	4.190	3.881	4.424
Frisian Holstein	2.702	2.607	3.136	2.583	2.754
half Frisian Holstein	409	469	1.054	1.298	1.670
% half Frisian Holstein	13,2	15,3	25,2	33,4	37,7

5.7. Fisheries

See also paragraph 3.7. During the period under report fisheries have been improved considerably. The fish production reached a level at which further expansion can be made only by improving storage and market facilities. Plans for the construction of a modern fisheries harbour in Paramaribo with proper facilities for ice production, the storage of fish, a wholesale market etc., have been designed and will be realized in 1962/1963.

According to the index numbers of TABLE 9, fish production increased fully 50 % in five years. The increase in the production of fish and shrimps is shown in TABLE 23. TABLE 24 presents figures on the number of fishermen and boats.

TABLE 23. Production of fish and shrimps in 1000 kg — 1954/60

	1954	1955	1956	1957	1958	1959	1960
Fish	1.450	1.940	2.564	1.800	2.720	2.781	2.973
Shrimps	450	560	736	365	535	539	657
Total	1.900	2.500	3.300	2.165	3.255	3.320	3.630

TABLE 24. Number of fishermen and boats — 1958/60

Year	Fisher- men	Boats			Trawlers	
		total	with outboard motor	with inside motor	number	tonnage
1958	780	520	280	10	3	192
1959	750	550	300	16	11	743
1960	740	530	375	14	12	806

The export of fish is negligible, the export of shrimps increased from 7 tons in 1954 to 197 tons in 1960. This increase is mainly a result of the activities of the shrimp-packing plant established in 1956. Trawl fishing is one of the most promising forms of fishing for the future.

5.8. Other developments

The most important other developments have already been mentioned in the paragraphs on "Marketing and processing", "Living conditions in rural areas" and "Policies and measures", respectively paragraphs: 3.8, 3.9 and 4.3. For full and detailed information reference is made to the yearly reports of the Department of Agriculture, Animal Husbandry and Fisheries, Paramaribo, Surinam.

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DEVELOPMENTS IN SURINAM AGRICULTURE

APPENDIX 1. Area and production of main crops (1954/1960)

Crop	Area in hectares						Unit	Production							
	1954	1955	1956	1957	1958	1959		1960	1954	1955	1956	1957	1958	1959	1960
Paddy ¹	22.368	22.257	25.021	28.233	31.211	28.546	30.308	1000 kg	66.665	64.526	71.234	55.128	85.049	78.693	80.710
Sugar ²	1.170	1.488	1.312	1.443	1.708	1.325	1.447	1000 kg. ²	5.704	7.242	7.037	8.405	8.907	9.108	11.138
Oranges ³	1.448	1.166	854	959	1.060	1.040	1.040	1000 fruits	41.244	35.886	39.656	32.132	47.727	58.502	45.696
Grape-fruit ³ ..	282	310	277	279	278	291	282	1000 fruits	4.931	6.336	10.551	5.833	11.555	15.167	12.645
Cacao ³	1.365	1.301	895	856	997	896	868	1000 kg	87	130	135	159	132	245	288
Coffee ³	1.782	2.171	1.492	1.655	1.128	1.440	1.531	1000 kg	450	473	272	407	144	500	563
Coconuts ³	2.373	1.952	1.683	1.625	1.582	1.227	1.243	1000 nuts	7.793	9.697	9.530	10.549	11.834	5.958	6.928

¹ Harvested area, including second crop.

² Sugar 96°.

³ 1954 and 1955 planted area, since 1956 harvested area.

APPENDIX 2. Landreclamation projects 1954/1960

	Gross acreage (ha)		Number of farms issued						Total	Agricultural land under cultivation in ha							
	1954	1955	1954	1955	1956	1957	1958	1959		1960	1954	1955	1956	1957	1958	1959	1960
Wageningen	6,141	—	1	—	—	—	—	—	1	500	2,000	4,000	5,800	5,900	6,000	6,000	
Nannipolder	1,460	—	176 ¹	—	—	—	—	—	176	400	600	820	880	917	900	900	
Uitkijkpolder	1,500	—	—	—	—	211	—	—	211	—	—	—	50	153	200	200	
La Poule	258	—	—	—	58	—	—	—	58	—	—	—	48	78	178	148	
Voorburg	125	—	—	—	59	—	—	—	59	—	—	—	35	75	94	70	
Nieuw Meerzorg	280	—	—	—	—	20	15	—	55	20	20	20	20	56	82	53	
Welgevallen	240	—	—	—	88	—	—	—	88	—	—	—	20	58	150	200	
Polder Weg naar Zee	330	—	—	—	50	—	—	—	50	—	—	—	5	17	20	20	
Mon Plaisir	50	—	—	—	48	—	—	—	48	—	—	—	5	16	20	30	
Tijgerkreek Oost	220	—	—	—	—	50	—	—	100	—	—	—	—	24	50	100	
Groot Henar	2,650	—	—	—	—	440	—	70	510	—	—	—	—	26	1,613	1,843	
Houttuin	889	—	—	—	—	—	160	—	160	—	—	—	—	5	155	325	
Leiding 6 West	120	—	—	—	—	—	—	30	30	—	—	—	—	—	—	—	
Total	14,263	—	177	—	303	281	510	175	1,546	920	2,620	4,840	6,863	7,325	9,462	9,889	
										Increase of agricultural land		1,700	2,220	2,023	462	2,137	427
										Total increase		1,969					

¹ Issued in the years 1952/1954.