INTRODUCTION

GENERAL INFORMATION

Surinam is a developing country in the northeast of South America. It lies between 2° and 6° latitude north and 54° and 58° longitude west. The country is bounded on the west by Guyana, on the north by the Atlantic Ocean, on the east by French Guyana and on the south by Brazil. Its area is about 163.000 square kilometers. The capital is Paramaribo. Surinam became independent on the twentyfifth of November 1975.

TOPOGRAPHY

Surinam can be divided into four regions:

- the young coastal plain with an area of about 17.000 square kilometers, which forms a strip along the coast of the Atlantic Ocean of 50 KM in the west to 10 KM in the east. Its soil consists of heavy clay and some sandy ridges. A large part of this plain lies below sea level and is artificially drained for crop production;
- the old coastal plain, which lies several meters higher. It consist mainly of complexes of sandy sediments, seperated by creeks and swamps;
- the savannah belt, consisting of poor sandy clay. Its area is about 12.000 square kilometers;
- the interior - Its soil, consisting of rock formations, covers roughly 75% of the Surinam surface.

CLIMATE

As Surinam is located near the Equator and is covered by heavy vegetation, its climate is humid and tropical with monthly temperatures from 25° C to 29°C. The hottest month is October and the annual rainfall is about 2500 millimeters. Sometimes it can reach more than 600 millimeters in one month, resulting in flooded areas where drainage has not been developed well. The seasons are divided into a long rainy season from April to August, a dry season from August to December, and between December and April usually a short dry season.

POPULATION

In 1974 Surinam's population amounted to about 400.000 inhabitants, consisting of various ethnic groups, divided as follows: Creoles 35%, Hindustani 35%, Javanese 15%, Bushnegroes and Amerindians 11%, Chinese 2% and others 2%.
The annual growth is actually 3.5% but an increase in emigration to rich industrial countries, mainly The Netherlands, has reduced this rate.
The following table will give an impression of the population divided into various age groups:

TABLE I

Composition of Surinam's population by age groups

Age group	%	Cumulative %
0 - 14 years	48	48
15 - 29 years	22	70
30 - 64 years	26	96
65 years and up	4	100

Source: Planning Bureau

The economically active population divided between the following economic sectors is shown below:

TABLE II

Economically active population

	1. 1960	1. 1970	1. 1972
1. Agriculture, Animal husbandry & Fishery	26.900	22.700	23.400
2. Forestry & Woodworking	1.800	3.100	3.400
Sub-total	28.700	25.800	26.800
3. Mining & Quarrying	3.000	6.400	6.900
4. Small industries, construction & housing	8.000	17.200	15.800
5. Trade, banking transport & insurance	16.900	16.500	16.200
6. Government	12.000	25.100	24.700
Total working population	68.600	91.000	90.400
Unemployed	3.300	8.700	14.100
Total active population	71.900	99.700	104.500

Source: Palnning Bureau

More than 50% of the population resides in Paramaribo and surroundings. From the west to the east Surinam is divided into 9 districts, named Nickerie (36.900 inhabitants), Coronie (3.600), Saramacca (14.000), Para (18,400), Suriname (157.600), Paramaribo (106.400), Brokopondo (17.200), Commewijne (19.600) and finally Marowijne (26.800).

HEALTH AND EDUCATION

Health conditions are reasonably good due to the availability of good drinking water and good health services.
The official language is Dutch, but the original languages of the various ethnic groups are also spoken.
The literacy rate is over 70% and study facilities are adequate.

THE GROSS DOMESTIC PRODUCT (G.D.P.).

The main production sectors are bauxite mining, agriculture and forestry. A Large part of the active population is concerned in agricultural production.

The following table shows their contribution to the various sectors:

TABLE III

Contribution to G.D.P. by sector
(in millions of Surinam guilders)
(Sf. 1.-- = U.S. $ 0.55)

Sectors	1960	1970	1971	1972
1. Agriculture, Animal Husbandry & Fishery	20.5	37.9	41.2	44.7
2. Forestry & Woodworking	7.0	13.6	15.5	13.9
Sub-total	27.5	51.5	56.7	58.6
3. Mining & Quarrying	59.0	162.6	186.7	181.5
4. Small industries, construction & housing	24.0	74.2	82.1	87.2
5. Trade, banking, transport & insurance	30.0	81.8	81.8	88.3
6. Government	41.5	120.6	130.7	139.2
Total	182.0	490.7	538.0	554.8

Source: Planning Bureau

In 1973 agriculture and forestry contributed 10.5% to the G.D.P. These sectors are, apart from bauxite mining, of great importance. Agricultural acitivities lie mainly on the coastal plain. The potential area is 95.000 HA, but only about 55.000 HA is under cultivation. It is estimated that more than 150.000 inhabitants depend on the agricultural sector.
From 1969 through 1973 the contribution of several crops to the planted area was as follows:

TABLE IV

	Planted area in HA of several crops				
Crops	1969	1970	1971	1972	1973
Paddy (rice)	33.240	39.150	40.150	37.400	45.000
Maize	230	120	120	140	150
Pulses	430	540	360	340	450
Peanuts	-	-	220	220	290
Vegetables	750	630	450	460	480
Bananas	2.400	2.000	2.200	2.100	2.000
Sugar cane	2.780	2.290	2.200	2.100	2.300
Citrus	2.570	2.170	1.770	1.850	1.840
Coconuts	1.420	1.400	1.250	1.100	1.150
Oilpalm	-	48	332	844	1.219
Cocoa	600	500	420	400	400
Coffee	920	750	520	440	430
Total	45.340	49.598	49.792	47.374	55.709

Source: Ministry of Agriculture

As the figures show, rice planting comprises more than 80% of the total cultivated area. Out of the total area of rice, 22.300 HA was planted by small farmers at the end of 1973 (± 50%) of which 18.000 HA (81%) is located in the Nickeriedistrict. Bananas, sugar cane, citrus and oilpalm are mainly planted on large private farms.

EXPORT

Rice, bananas and citrus fruit are the most important agricultural export commodities. The export figures of these products in tons and Surinam guilders is shown in table V (see page 6).

IMPORT

On the other hand the import of food commodities had, f.i. in 1972, a value of Sf. 35 million.
This means that the balance of food export and import is unsatisfactory, although there is a great potential to increase the production in the agricultural sector.

LIVESTOCK

At the end of 1969 Surinam counted 39.800 head of cattle on about 7.900 farms, which were mainly situated in the Suriname district, with some holdings planted with high quality grasses. After 1969 and up to 1973 the number of cattle decreased to 32.000 head.
Milk production for local consumption decreased rapidly due to the low Government milk price and the high cost of fertilizers, insecticides and cattle forage. In the beginning of 1975 the Government increased the milk price.
The import of meat increased from 1.500 tons in 1965 to 1.700 tons in 1971, whereas the domestic production by slaughtering all kinds of cattle, including female ones, remains constant at 1.250 tons a year. This means that an enlargement of our meat production will be necessary before long.

PIGS

At the end of 1973 we find precisely 20 reasonable good farms with about 5.000 pigs. The production for local consumption varies from 500 to 700 tons a year.

POULTRY

It is estimated that about 30 farms are practising and producing high quality poultry commercially. The number of chickens is about 800.000 with 2.500 to 4.000 tons of the production for local consumption. A number of farmers keep poultry for their own consumption.

TABLE V

EXPORT OF RICE, CITRUS AND BANANAS

	1971		1972		1973		1974	
Commodities	in tons	x Sf 1000	in tons	x Sf 1000	in tons	x Sf 1000	in tons	x Sf 1000
Rice	3[illegible].600	12.145	27.340	7.800	44.800	20.500	47.600	P.M.
Bananas	38.100	4.700	39.700	4.600	30.000	3.700	P.M.	P.M.
Oranges	4.815	2.055	2.040	1.700	1.980	1.790	1.400	1.200
Grapefruits	6.275	3.050	2.850	2.400	1.800	1.370	1.350	680
		21.950		16.500		27.360		---

Source : Ministry of Agriculture and
Cooperative of Citrus Growers

FISHERY

Fishing in Surinam is divided into seafishery, done by fishing companies, and coastal, estuary, river and swampfishery, done by small fishermen.

The Surinan American Industries Limited (SAIL) is the most important fishing company which has been granted permission for shrimp export Surinam counts about 1.200 small fishermen, working on 500 boats with outboard motors, who deliver their product to the local market. Furthermore, Korean, Japanese and American trawlers deliver fish and shrimps to SAIL and other processing plants. These trawlers produced about 3.400 tons of fish and shrimps during 1973. Fishery in Surinam has to be improved by introducing better fishery methods. Several plans have already been made in that respect.

FORESTRY

Surinam has extensive forestry possibilities. There are about 150 concessionaries supplying wood to several woodworking companies of which Bruynzeel is the largest.

There is an export market to the Caribbean and Europe.

The Government Forestry Service is now experimenting in a pilot sawmill with several types of wood which have not been used up to now.

GOVERNMENT POLICY

The policy of the Government is to create more employment in various economic sectors. On behalf of the agricultural sector several landsettlement and resettlement projects are being undertaken in the districts. It is planned that in a period of 15 years Surinam should be able to feed its own population with domestic products which must then substitute the imported food commodities. At the same time the export volume of agricultural products should be enlarged. A great deal of attention has been paid to the improvement of the living conditions of the rural population by improving the production circumstances. These plans should result in a rapid increase of agricultural production.

The financing of the infrastructure in the new landsettlement projects will be done by the Government itself, whereas the financing of the newly created holdings will be taken care of by the Agricultural Bank, which might be allotted more funds by the Government for that purpose.

GOVERNMENT

The central administration of the Government is being conducted in 15 departments. Each department is headed by a Director who is assisted by his staff and qualified personnel.
These fifteen departments are :

1. Ministry of General Affairs
2. " of Finance
3. " of Economic Affairs
4. " of Agriculture, Husbandry and Fisheries
5. " of Development
6. " of Police and Justice
7. " of Home Affairs
8. " of Public Works
9. " of Rural Government and Decentralization
10. " of Education, Culture and Community Development
11. " of Social Affairs
12. " of Health
13. " of Labour and Housing
14. " of Defence
15. " of Foreign Affairs

For each department a Minister is responsible.

The Ministry of Rural Government and Decentralization is headed by a Director, an Assistant-Director, various section heads, administrative and technical personnel. For Government purposes, Surinam is divided in nine districts. Paramaribo, which is under the supervision of the Ministry of Home Affairs.
The Ministry of Rural Government and Decentralization is in charge of the other eight districts:

the district of Surinamo
" " " Para
" " " Brokopondo
" " " Saramacca
" " " Coronie
" " " Nickerie
" " " Commewijne
" " " Marowijne.

WATER SUPPLIES

HISTORY

The first water supply system in Surinam was built in 1930 by the SURINAM WATER COMPANY.
At that time the stockholders were several banks, a trading company and the Government of the Netherlands.
In 1948 the Government took over all shares of the Company.
The S.W.C. is in charge of the water supplies of the capital Paramaribo and two towns Nw. Nickerie and Albina.
Fully aware of further need of safe potable water in other rural areas, the Government created in 1962 a Water Supply Section under the Ministry of Public Works.
This task was transferred to the Ministry of Rural Government and Decentralization, estabished in November 1969, which Ministry is also the Government representative and hence the only stockholder of the Surinam Water Company, The relations between the Government and the company are such that although all shares are in the hands of the Government, the Company functions as an autonomous business enterprise.

The Water Supplies Division of the Ministry of Rural Government and Decentralization is responsible for:
Development, operation and maintenance of water supplies in rural areas.

With the assistance of WHO/PAHO and UNDP a comprehensive study on water supplies was carried out (1969 - 1973), resulting in a water supply program till year 2000.

Besides the Surinam Water Company and the Water Supplies Division of The Ministry of Rural Government and Decentralization, there are also some private Companies which have built water supply plants for their employees.

PRESENT SITUATION

At present there are 30 water supply plants in operation in the country, while 9 are under construction.

The percentages of population served are as follows:

1976

URBAN Population	217.000
RURAL Population	163.000
Total	380.000

	URBAN			RURAL		
	House connections	Easy Access	Total	House conn.	Easy Access	Total
Population served	76%	24%	100%	17%	37%	54%

The goals for 1981 are as follows:

Estimated population :	URBAN	280.000
	RURAL	270.000
	Total	550.000

	URBAN			RURAL		
	House connections	Easy Access	Total	House conn.	Easy Access	Total
Goals	95%	5%	100%	50%	32%	82%

TECHNICAL ASPECTS

GENERAL

The responsibilities of the Government in connection with Water Supplies can be specified as follows.

-1- Development, operation and maintenance of water supply systems.
2- Provide water through private house or yard connections.
3- Provide water through public standposts with piped water from a water supply system.
4- Provide water through public standposts with water directly from shallow wells.
5- Provide water by water carriers (by truck, train or boat).

EXPLANATION:

2- These connections may be divided into:
a- One single Fordilla valve without meter inside a private yard.
b- One single ordinary screw tap in the yard or inside the house with metered service.
c- A variety of plumbing fixtures with metered service.

3- This is done in several areas to serve poor people, who cannot afford to have a private connection.
4- This is done in areas where the population concentration is so small that it is not justified to install a water supply system.
5- This is done in extreme dry seasons to areas without water supply. The carriers are filled from a water supply system and transported to the houses, where drums are filled.

DEMAND

The average daily consumption in Suriname is projected as follows.

a- In areas with combined service (2 and 3)

1972	65 l/c/d
1987	100 l/c/d
2000	130 l/c/d

b- In areas with predominantly public standposts.

1972	30 l/c/d
1987	40 l/c/d
2000	50 l/c/d

Rates in Sf (1 U.S. $ = Sf. 1.80).

	MONTHLY RATE S.W.C. areas	MONTHLY RATE Rural areas	For each m^3 excess. S.W.C.	For each m^3 excess. Rural
A. Dwellings with rental value higher than Sf.50,= (for 15 m^3 per month).	7.50-15	7	0.50	0.25
B. Dwellings with rental value higher than Sf.50,= (for 12 m^3 per month).	4.10	4	0.50	0.25
C. Semi-public standposts with responsible owner	2.40	-	0.50	-
D. Private Yard - connections with ordinary screw tap	4.10	4	0.50	0.25
E. Private Yard connections with Fordilla valve	-	2	unmetered	

N.B.

All other public supplies such as public standposts and water from carriers are free of charge.

PUBLIC STANDPOSTS

At the time the shares of the Surinam Water Company ~~was~~ were in hands of private owners the Government was charged for the installation cost of and the supply through public standposts at a rate of Sf.0-25 per m^3 delivered and also for the repair-costs. The regular maintenance was paid for by the Company.

In 1973 a decision was taken by the Government that the supply through public standposts should be beared by the Company. The Government would pay installation costs and exceptional repair costs, intionally caused by the users.
The result of this decision is poor service and reluctance on the side of the Company to increase the number of standposts.

In the city system there are three types of public standposts:

a- The ordinary screw tap along the streets.
These are generally ½" taps. As stated above the users are not charged for the water.
As a consequence, wastage is high, while damage occurs frequently.

b- The "semi-public" standposts.
These are situated within a private yard and serve more than one household.
Generally the owner of the lot pays for the construction, operation and maintenance, adding the cost for each tenant to the rent of the house.
The use of the system is generally controlled by the owner, who lives in most cases in the front building of the lot.
The advantage of this system is that there is little wastage, while damage is also limited to a minimum.
A disadvantage is that in many cases unreasonable rates are charged.

c- Hydrants to fill water carriers and hydrants for fire protection. The distribution of water by water carriers is organised by Government free of charge.
Only in extreme dry seasons private trucks are hired for this transport.

PROBLEMS

The major problem in distribution of water by trucks is that the drivers are charging payment for the water delivered. Control of this situation is very difficult because some people, in bad need of water, are willing to pay.

In Rural areas another system has been developed, where there are no public standpipes. For poor people about 70% of the installation cost is paid by the Government, while 30% may be paid in five monthly instalments.
In this case a standpost in the yard, with a fordilla valve is placed (unmetered).
The user pays Sf.2,= per month as a flat rate.

In several villages in the hinterland, populated by so called Bush Negroes there are only public standposts, placed by Government free of charge.
The water is also delivered free of charge.
Wastage and damage is controlled by the local authorities (see example Brownsweg).

WATER SUPPLIES IN TRANSMIGRATION VILLAGES.

GENERAL

Brownsweg is one of the so called "Transmigration" Villages in the district of Brokopondo.
Before the area of the Afobaka lake was flooded by building the dam, the population of several settlements were transferred to villages up-streams and downstreams the dam.
The villages downstreams are:
Klaaskreek, Remoncourt, Brownsweg, Marchall, New Koffiekamp, Compagniecreek and others with a present total population of approximately 7500.

In these new settlements Government is providing among others Water supply, Electricity, Housing, Schools, Medical Aid free of charge.
The local authorities, consisting of Head Captains, Captains, and Bassia's are taking care of the operations and maintenance, assisted by representatives of the Central Government with the District Commissionar as coördinator.

Water Supplies

The following villages has a Water Supply system.

Village	Population 1977	Public Standpost Total	Population Served. per tap
1. Brownsweg	3000	45	67
2. Klaaskreek	2000	40	50
3. Remoncourt	1100	20	55
4. Nw. Koffiekamp	500	20	25
5. Hermansdorp, Tapoeripa	400	20	20
6. Marchall (under constr.)	400	15	27

BROWNSWEG WATER SUPPLIES

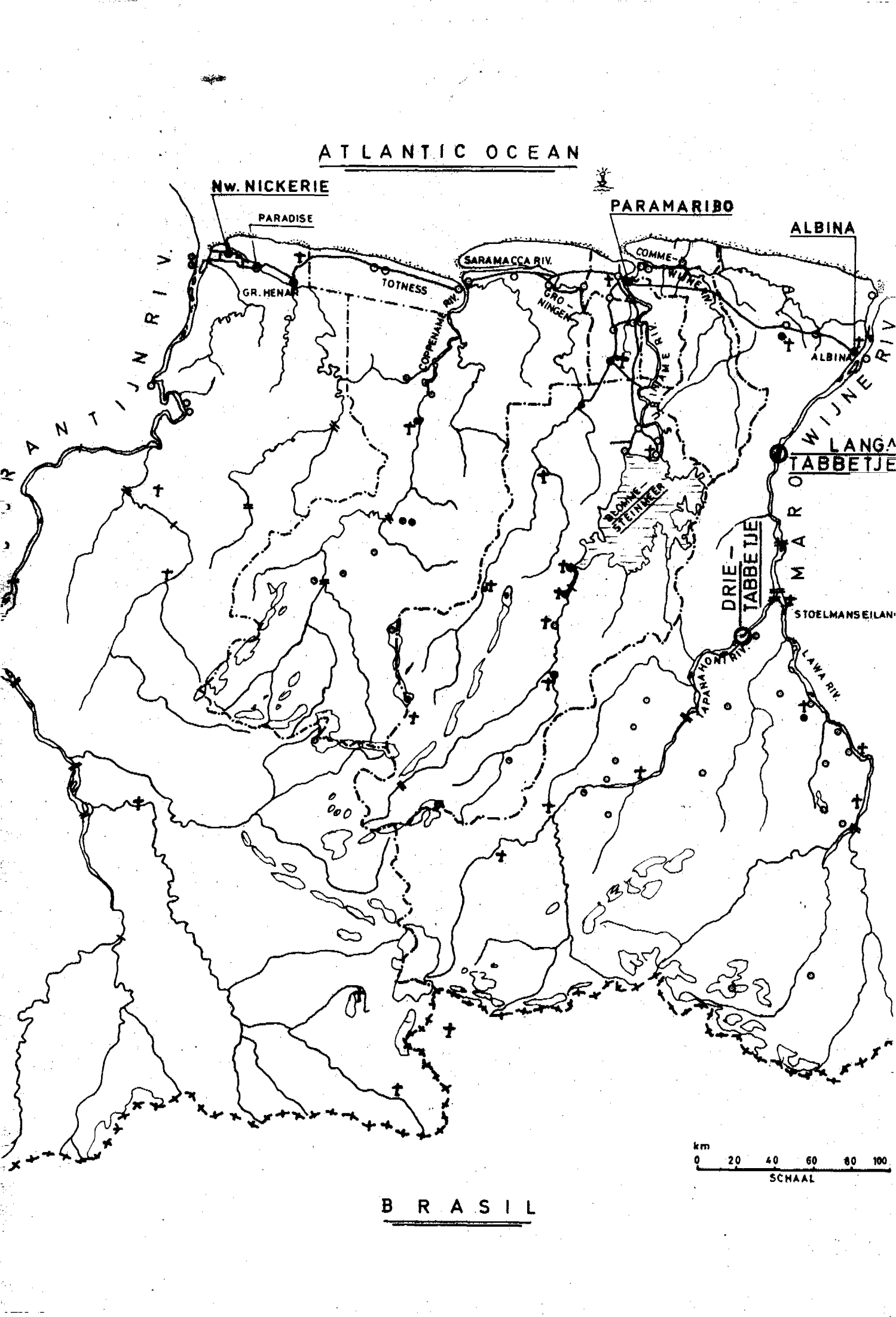
At Brownsweg there is a Water Supply Plant treating water from the lake by slow sand filtration.
The plant has the following elements (see figure):
a. Pumping station with a capacity of 10.. m^3/hour.
b. One sedimentation tank
c. Two slow sand filters with a capacity of ..5....m^3/h each.

d. One chlorination tank
e. Three reservoirs with a total capacity of 180 m^3.

The filters are operating at a velocity of 0.25 m/hour.
The chlorine con content should be approximaty 0.5 p.p.m.
By placing the filters and reservoirs on a hill the whole system, including distribution operates by gravity.
There are 45 public standposts of the Fordilla type.

OPERATION AND MAINTENANCE

It is remarkable that the wastage is very low compared with other areas, while damage does not occur at all.
A reason for this could be the respect of the population for the local authorities consisting of 1 Head Captains, 6 Captains and 32 Bassia's. The technical operation and maintenance is the responsibility of employees of the Water Supplies Division.


ATLANTIC OCEAN
Nw. NICKERIE
PARADISE
GR. HENAR
TOTNESS
COPPENAME RIV.
SARAMACCA RIV.
GRO-NINGEN
PARAMARIBO
COMME-WINE RIV.
ALBINA
ALBINA
MAROWIJNE RIV
LANGA TABBETJE
BLOMME-STEINKREEK
DRIE-TABBETJE
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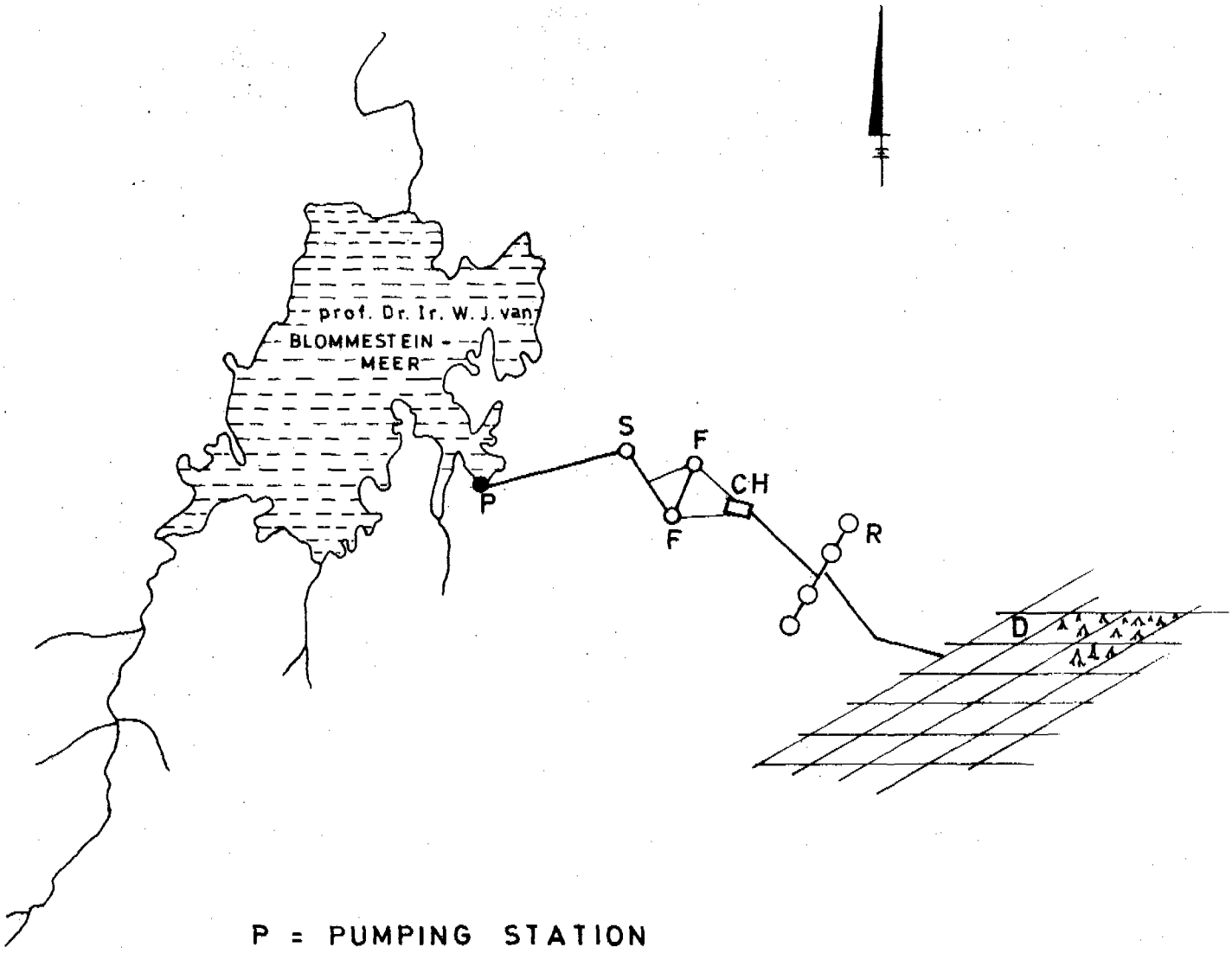
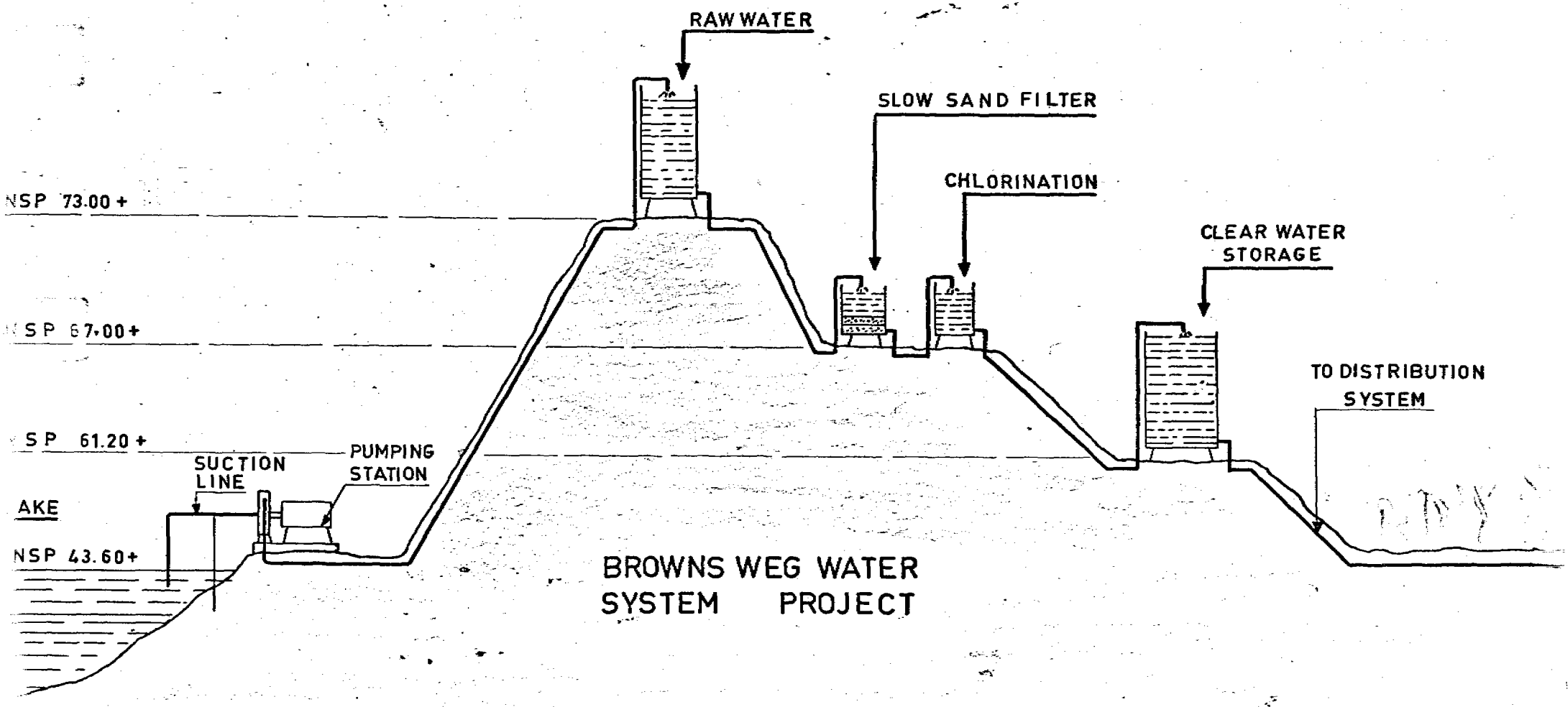


P = PUMPING STATION
S = SEDIMENTATION TANK
F = SLOW SAND FILTER
CH= CHLORINATION TANK
R = CLEAR WATER STORAGE
D = DISTRIBUTION SYSTEM

WATER SUPPLY SYSTEM – BROWNSWEG


RAW WATER
SLOW SAND FILTER
CHLORINATION
CLEAR WATER STORAGE
TO DISTRIBUTION SYSTEM
NSP 73.00 +
SP 67.00 +
SP 61.20 +
SUCTION LINE
PUMPING STATION
AKE
NSP 43.60+
BROWNS WEG WATER SYSTEM PROJECT