

**PULP AND PAPER
ADVISORY GROUP
FOR LATIN AMERICA**

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***ECONOMIC COMMISSION FOR LATIN AMERICA
FOOD AND AGRICULTURE ORGANIZATION
BUREAU OF TECHNICAL ASSISTANCE OPERATIONS***

REPORT TO THE SURINAM GOVERNMENT
ON THE
PROSPECTS OF THE PULP AND PAPER INDUSTRY IN SURINAM



Santiago Chile



1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection practices and the use of advanced analytical techniques to derive meaningful insights from the data.

3. The third part of the document focuses on the role of technology in data management and analysis. It discusses how modern software solutions can streamline data collection, storage, and analysis processes, thereby improving efficiency and accuracy.

4. The fourth part of the document addresses the challenges associated with data management, such as data quality, security, and privacy. It provides strategies to mitigate these risks and ensure that the data remains reliable and secure throughout its lifecycle.

5. The fifth part of the document concludes by summarizing the key findings and recommendations. It stresses the importance of a data-driven approach in decision-making and the need for continuous monitoring and improvement of data management practices.

6. The final part of the document provides a brief overview of the future trends in data management and analysis, highlighting the potential of artificial intelligence and machine learning to further enhance data-driven decision-making.

I. INTRODUCTION

Acknowledgments and previous studies

This study is undertaken at the request of the Minister President of Surinam, Mr. S. D. Emanuels.

The United Nations Pulp and Paper Advisory Group visited Surinam during the period 29 May to 7 June 1959. During this time, short as it was, the mission was able to make three very well organized field trips and discuss the problems with civil authorities and industrial leaders.

The Group offers its most sincere thanks to the Chief of the Surinam Forest Service, Mr. I.A. de Hulster, and to Mr. S.P. Moolenaar, of the same service, who very efficiently paved the way for the mission and assisted it in every respect.

In the preparation of the field trip and, later on, the report, the following studies were of great assistance:

J.W. IJff, Onderzoek over verwerking van gemengd Surinaams loofhout tot papiercelstof, Royal Tropical Institute, Delft, 1955.

G.H. Chidester, Suggestions for development of pulp and paper industry in Surinam, United States Operations Mission to Surinam, 1955.

P.M. Le Cacheux, Report to the Caribbean Commission on a Preliminary Pulp and Paper Survey, FAO, 1956.

P.M. Le Cacheux, Report on a Preliminary Pulp and Paper Survey in Surinam including possibilities for wallboard manufacturing, Caribbean Commission, 1958.

Erik J. van den Ent, High-yield pulping of tropical hardwood species, Abstract of a thesis presented in the College of Forestry, Syracuse University, New York, 1959.

Much information was gathered from the following Government publications:

Facts and Figures about Surinam, 1958

Bos en Bosbeheer in Suriname, 1958

Surinam Timber, 1955

Verslag 1957 Tienjarenplan Suriname, 1958

/Mr. Le Cacheux's

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Mr. Le Cacheux's reports are very comprehensive, and this report supplements his on Surinam. All the background data necessary for a report are to be found in Mr. Le Cacheux's study.

In the hope that this report may throw some additional light on the problems of industrialization in Surinam, it is hereby respectfully submitted.

Jouko Koljonen
Leader, United Nations Pulp and Paper
Advisory Group for Latin America

/II SUMMARY FINDINGS

II. SUMMARY OF FINDINGS

The diversification of its economic life is of vital importance for Surinam. The country offers a good supply of timber for pulping purposes and preliminary tests of the suitability of these trees have already been made. However, in addition to the laboratory work pilot plant tests are necessary. Chemicals, other necessary supplies and machinery have to be imported.

In the area affected by the big Brokopondo project, Jodensavanne offers a likely site for a mill, being close to the forests, accessible to ocean-going vessels and endowed with a good water supply.

From the marketing point of view, Western Europe offers possibilities and the Venezuelan market is also worth detailed study. If Surinam were to have access to the European Common Market, this area could be attractive.

Estimates of production costs in Surinam indicate that pulp and paper can be produced at "normal" costs. According to estimates of the economic results of the three alternatives studied, if it is assumed that the price would be somewhat lower than the current price for corresponding "traditional" commodities, that Surinam's products could be exported to Western Europe duty-free and that an efficient and established marketing organization would be available, some type of paper production might be profitable. Pulp production would not yield a satisfactory return.

It must be stressed that, apart from technical questions, any degree of success of pulp and paper operations in Surinam depends on the possibilities of duty-free entry to the consuming countries and of assistance from an efficient and established marketing organization. The estimates indicate that, if import duties had to be paid, every alternative studied would result in a loss.

The pulp and paper production in Surinam seems to be connected with many still uncertain marketing factors.

It will be necessary to study these factors more ingoing, to enable a positive planning as to the priorities of capital investment.

/III. GENERAL

III. GENERAL CONSIDERATIONS

At present the economy of Surinam is rather one-sided, being chiefly based on agriculture and bauxite mining. In foreign trade, bauxite now represents approximately 80 per cent of total exports.

In the effort to develop the country and diversify the economy, much attention has been given to the possibility of creating a larger forest industry in Surinam.

Surinam's forests are extensive, but as is the case with all tropical forests, the stands consist of an extremely wide variety of species, for only a very few of which an economic use has been found.

The present state of Surinam forests and forest utilization has been summed up by the Surinam Forest Service in its progress report to the Latin American Forestry Commission (FAO/LAFC-58/23), as follows:

"Surinam covers an area of some 143 000 square kilometres on the northern shore of South America. The country is completely tropical. Rainfall amounts to 2 000 - 2 400 mm. per year, while the average temperature is 26°C. The maximum rainfall is registered in May (300 mm.), the minimum in October (60 mm.). the relative humidity is between 76 and 86 per cent.

"The population, comprising about 200 000 inhabitants, is mainly concentrated in a coastal strip on the Atlantic Ocean. Primarily this coastal strip consists of low-lands traversed by many large rivers, which in general flow from south to north, but turn westward near the coast. The productive agricultural area, which covers about 30 000 hectares is situated here.

"Inland from the populated strip the country gradually slopes up to the Brazilian border. It is covered by mixed tropical rain forests, sometimes interspersed with savannahs. The forest of commercial importance may be broadly divided into two types, namely, swamp forests in the young and old coastal plains and dry land forest in the interior.

"Apart from relatively small forest tracts on old and abandoned plantations, all forests are owned by the State and administered by the Forest Service, re-established in 1947. Shifting cultivation in this area, mainly by Bush negroes and Amerindians, is tolerated in the neighbourhood of their settlements.

/"Management and

"Management and administration of the forests were made the subject of legislation in 1947.

"The whole of the logging and timber industry is in the hands of private enterprise. Logging is executed on Government-owned lands, where concessions or timber-cutting rights have been granted on an area of about 1.25 million hectares by the Ministry of Development, upon the recommendation of the Land Bureau and the Forest Service.

"Extraction is effected inefficiently, partly by manpower, partly by wheel - or small crawler tractor. The logging industry has been almost wholly located along the river banks. It is prohibited to fell trees with a diameter of less than 30 centimetres at b.h.

"Logs are usually transported by water to Paramaribo, the capital of the country, where there are 16 sawmills and a plywood factory, as well as factories making crates, strip - and parquet flooring, prefabricated houses and matches, and shops for joinery, moulding and furniture. The construction of a particle board factory with an input of about 50 000 m³ raw materials - partly wastage from the plywood factory - is nearing its completion.^{1/}

"Recently wood preservation has been coming into increasing favour with the building industry and since the end of 1956 a small impregnation plant has been operating.

"Though the annual cut is only about 130 000 m³, the timber industry yields roughly 10 per cent of the value of Surinam's annual exports, as against the 80 per cent contributed by exported bauxite, the country's principal natural resource.

"As the country is almost totally covered with forests, it is obvious that there are substantial possibilities for increasing and improving productions".

^{1/} Since this report was submitted, the factory has entered operation (early in 1959).

Exports during 1955-57:

	<u>1955</u>	<u>1956</u>	<u>1957</u>
Roundwood	11 517 m ³	13 066 m ³	16 992 m ³
Hewn	5 440 "	6 220 "	7 953 "
Sawn	1 571 "	1 072 "	1 598 "
Sleepers	2 563 "	4 209 "	3 697 "
Girders	330 "	415 "	321 "
Flooring	205 "	239 "	68 "
Prefabricated houses	-	3 027 "	802 "
Plywood	10 471 "	12 564 "	13 948 "
Total value	Sf.4 467 818	Sf.5 663 964	Sf.5 841 165
Letterwood	931 kg	9 231 kg	5 239 kg
Balata	232 200 "	567 300 "	188 200 "
Palm kernels	198 300 "	229 000 "	-

In addition to this report it should be noted that within the framework of the Surinam Ten-Year Plan the well-developed Forest Service is now conducting a forest inventory based on aerial photographs, which are available in general on a scale of 1:40 000 and in part, especially for the swamp forests, on a scale of 1:10 000. The most important types of vegetation are chosen for a 2 per cent strip sampling ground survey. Up till now this survey has been carried out over an area of about 250 000 hectares between the Cottica and Coppename rivers.

On the basis of this inventory it has been possible to decide which areas of the high dry-land forests are most suitable for opening up by road.

The first forest access-road project between the Saramacca and Coesewijne rivers has already been completed, and opens up an area of about 30 000 hectares by 60 km of unsurfaced road. A second project of about the same scope between the Surinam and Coesewijne rivers is now being carried out.

Swamp forests are being opened up by the construction of canals.

Once an inventory has been made and the area is opened up, private operators can obtain timber concessions on the submission of working plans.

The general economic and political atmosphere in Surinam is quiet and stable; the currency is hard and trade restrictions are few. From this point of view the country is an attractive one for foreign investment.

/IV. PULP

IV. PULP AND PAPER INDUSTRY

The fact that only approximately 10 per cent of the trees in the inventoried and opened-up forests is at present suitable for economic use (sawn goods, plywood, marine piles, etc.) has aroused interest in industries which would be able to use much more of the timber available.

The many surveys made and even pilot plant operations have yielded sufficient information about the pulping properties of tropical hardwoods.^{2/} Two recent studies^{3/} on the natural mixture of special Surinam hardwoods have confirmed that it is possible to produce acceptable paper pulp from these species.

The swamp forest species of the coastal belt have not been investigated sufficiently as yet and interest has therefore been concentrated in the dry land rain forests.

A fact of the utmost importance for the discussion of a possible pulp and/or paper industry in Surinam is that the local market is altogether too small to justify any kind of domestic production (total annual consumption amounts to less than one thousand tons), and that practically the whole production of any future mill would thus have to be placed on competitive foreign markets. This excludes the small-size mills from consideration, the capital charges per ton of product being too high. The minimum size, from this point of view, is probably an approximate capacity of 200 tons per day.

1. Assessment of the factors of production

The following main factors have to be considered when planning pulp and/or paper production:

- (a) Availability and cost of timber;
- (b) Availability and cost of chemicals, power and water;
- (c) Availability and cost of labour of all categories;
- (d) Transport distances and cost;
- (e) Investment and capital costs;
- (f) Marketing possibilities.

^{2/} Pulp and Paper Prospects in Latin America, pp. 57-210.

^{3/} J.W. Ijff: Onderzoek over verwerking van gemengd Surinaams loofhout tot papiercelstof.

Erik J. van den Ent: High-yield pulping of tropical hardwood species.

Though all the major rivers flow through the dry land forest area and thus provide access to a large part of these forests, the sites of major interest are, for many reasons (industrial development, forest inventories, forest road construction, roads), between the Rivers Cottica and Coppename.

Sea-going vessels can easily penetrate up the River Cottica as far as Moengo on the outskirts of the rain forest area where bauxite from nearby open pits is loaded. On the River Surinam the corresponding point to-day is Paranam, the site of the bauxite industry and the future location of aluminum smelter works. However, the Brokopondo project now in execution will regulate the flow of the River Surinam and enable sea-going vessels to reach Jodensavanne, where the rain forest belt begins and where coniferous plantations have been established.

The possible mill sites at or near Moengo and Jodensavanne seem to be at least as good as any others in Surinam. Both have a big advantage over any sites at the river mouth in that they are close to the forests and at the same time accessible to ocean-going ships.

The relative advantages of the two alternatives mentioned may be summarized as follows:

	<u>Moengo</u>	<u>Jodensavanne</u>
Cost of equipment	Same	Same
Freight of equipment	Same	Same
Raw materials: timber	Large-scale exploitation should be developed	Large-scale exploitation should be developed. Some coniferous plantations
Chemicals	Clay cheaper Others same	Clay dearer Others same
Fuel	Same	Same
Power	Must be developed	Access to Brokopondo transmission line

/Water

	<u>Moengo</u>	<u>Jodensavanne</u>
Water	Abundant	Abundant, good
Stream pollution	No problem	No problem
Labour	Same	Same
Housing	Same	Same
Health conditions	Same	Same
Connexions:		
Local	Same	Same
With export markets	Same	Same

Thus Jodensavanne seems to have a slight advantage over Moengo.

(a) Availability and cost of timber

An inventory has been made of the forests near Jodensavanne and Moengo; in both cases there is plenty of timber available.

In the area east of the River Surinam and south of Jodensavanne the total timber volume, computed on the basis of trees with a diameter of 15-20 cm at a height of 1.30 m, is 250-300 m³ per hectare.

A sample natural mixture of the most important species has been investigated with good results in the Laboratory of the Delft Institute of Technology (J.W. Ijff). The specific gravity (B.D.) of a mixture of 53 trees was 0.6544 and the yield of unbleached pulp (B.D.) based on B.D. wood approximately 47 per cent.

If a 15 per cent loss in barking and chipping is assumed, together with a further 10-per cent loss in bleaching operations, the wood (B.D.) requirements for one ton of bleached (B.D.) pulp will be 2.80 tons, corresponding to 4.30 m³.

Taking into consideration the loss of timber owing to decay shrinkage and the expansion of wood due to moisture, the green volume required per ton of pulp would be approximately 4.45 m³.

On the supposition that 200 tons of commercial bleached sulphate pulp will be produced per day, daily wood requirements will be approximately 810 m³, and annual requirements 260 000 m³.

If the industry's fuelwood consumption is approximately 1 m³/ton of product, the annual extraction of fuelwood will amount to about 65 000-70 000 m³ from the pulping point of view, less suitable trees being used for fuel.

/About 10 m³/ha

About 10 m³/ha of the wood in the forests at Jodensavanne can at present be used in saw-milling and approximately 5 m³/ha for marine piling.

Of the 250-300 m³/ha in these forests, at least 235 m³/ha are left over for use in the pulp and/or paper industry. Thus it may be estimated that the amount extracted annually will correspond to the total stands of 1 400 hectares.

According to the experience of the Surinam Forest Service, the average cost of extraction on this scale, including depreciation of a narrow-gauge forest railroad and roads and other investments, will amount to SF1 12.50/m³. If SF1 1.00 is added for stumps, the total cost of wood delivered at Jodensavanne will be SF1 13.50/m³ (equivalent to 7.20/m³ dollars).

Timber for the sawmills is currently priced at SF1 20.00 m³ delivered at the river, which corresponds to 10.55 dollars and timber for marine piling at SF1 60.00 m³ (31.55 dollars).

The total annual cut can be estimated at: 260 000 + 65 000 + 13 000 + 6 500 = 344 500 m³, and the total cost delivered at 344 500 x 7.20 = 2.46 million dollars.

Timber for saw-milling would give 13 000 x 10.55 = 137 000 dollars.

Timber for marine piling would give 6 500 x 31.55 = 205 000 dollars.

Thus the 325 000 m³ needed for an eventual pulp and paper mill would carry a total cost of 2 138 million dollars or 6.57/m³ dollars.

(b) Availability and cost of chemicals, power and water

All the chemicals needed for pulp and paper production have to be imported at present, even limestone. A kaolin deposit is known to exist near Moengo, which might be used if demand justifies its exploitation. It is, of course, possible to produce the alum needed for sizing directly from bauxite ore, but the quantities are too small for low-price operation.

4/ This quantity of timber is not sufficient to justify a saw-mill for integration with the pulp mill. However, if a larger share of the trees were suitable for saw-milling integration should be studied. In that case the pulp mill could use the saw-mill refuse.

5/ If further tests show that, in addition to the 65 000-70 000 m³ now earmarked for fuelwood, there is a considerable amount of timber which does not produce acceptable quality pulp, the extraction costs will probably be somewhat higher.

/An electrolytic

An electrolytic plant is contemplated at Paramaribo, but will probably not be established for a long time to come.

The cost of chemicals, however, is usually well below 10 per cent of total production costs. Hence, even a fairly high variation in this cost item does not make any very significant change in total costs.

The Brokopondo project now in execution contemplates the production of approximately 1 300 million kWh annually at the Affobakka hydroelectric power station. Of this energy, however, which will probably be available in 1965-66, 90 per cent will be used by the new alumina plant and aluminum smelter in Paranam. The remaining 10 per cent is reserved for Paramaribo where it will replace the present diesel-generated electricity supply, or may also be used for industrial development elsewhere. The second phase of the hydroelectric power plan, the River Saramacca dam and plant will come into execution immediately after the Brokopondo project, that is, in 1965-66. Power will be available in 1968-70.

The price of the power transmitted to Paranam will be approximately 1 US cent kWh. In the pulp and paper calculations this price is assumed.

A sulphate pulp and paper mill can generate a considerable amount of energy by expanding the steam used in the process. In annex 1, heat and power balances are calculated for three types of production. Of the various mill combinations presented in annex 3, the most energy-consuming is alternative (c) (115 tons/day of bleached fine papers and 125 tons/day of wrapping papers); in this case the energy to be bought from outside amounts to about 33 million kWh/year, which can be supplied from the 10 per cent of Affobakka power available or from Saramacca power.

The water supply is abundant, and the River Surinam will in future have a regulated flow of approximately 400 m³/sec. There will be no pollution problems.

The river water at Jodensavanne has been tested (annex 2). The results show that the water is of good quality, but has a rather high iron content.

(c) Availability and cost of labour

In Surinam, which has no paper industry of any kind at present, future mills have to calculate on a larger number of workers than

/corresponding mills

corresponding mills in countries with longer traditions. Thus, it may be estimated that a mill producing 200 tons/day bleached pulp will require approximately 350 men, of whom about 100 ought to be in the skilled category. An integrated mill, producing 200 tons of pulp and 250 tons of wrapping paper, will probably require about 700 men, of whom approximately 240 will be skilled.

Although the Surinam labourer has the reputation of learning easily, and labour is available in the coastal regions, the recruitment of workers should be undertaken carefully and a modern training programme planned in good time in order to avoid unnecessary difficulties during the first years of operation.

The present industry in Paramaribo pays for skilled labour SF1 6-7 per day, equivalent to 3.24-3.78 dollars and for unskilled labour SF1 3.0-3.50 per day, corresponding to 1.63-1.89 dollars. To these wages must be added approximately 25 per cent in social benefits.

Administrative and technical personnel are paid according to European standards. Personnel recruited overseas is usually entitled to home leave every five years with fares paid by the employer, in addition to annual leave.

During its early years, a pulp and paper mill would have to employ a certain number of technicians with adequate industrial experience acquired in a more developed area.

(d) Transport distances and cost

A mill situated at Jodensavanne and producing for export has the following transport problems: (i) Ocean transport of the mill's own products and of import requirements, (ii) land transport of timber from nearby forests and (iii) communications with other parts of the country.

(i) At present ocean-going vessels cannot reach Jodensavanne,^{6/} at least not during the dry season. However, it is expected that, after the regulation of the river, the minimum waterstand will be approximately two metres above the present dry season level, and ships able to pass the barrier at the mouth of the River Surinam (minimum depth 3.5 metres) will most probably reach even Jodensavanne, 73 km inland from Paramaribo.

^{6/} See P.M. Le Cacheux, Report on a Preliminary Pulp and Paper Survey in Surinam, Caribbean Commission, September 1958, p. 34, map.

On the assumption that production will be shipped direct from the mill to a European port, the freight charges for pulp and paper may be estimated at about 20 dollars/ton, for an approximate volume of 5 000 tons/month.^{7/}

It may be possible to negotiate better terms if sufficient return freight is available.

The bulk of the chemicals needed (limestone, sulphur or saltcake, salt, fuel oil, paper-making chemicals) can be imported from Trinidad, from where the bauxite ships return with plenty of freight space.

(ii) The extraction of timber from forests near Jodensavanne is possible only if a network of all-weather roads and/or a narrow-gauge railroad is built. The Forest Service now has experience of the cost of opening up forest in other areas, and transport costs with adequate depreciation are included in the price of timber delivered at Jodensavanne, as indicated earlier (page 10). The forest area near Jodensavanne has been opened up and a network of forest roads is under construction.

(iii) The only existing means of communication between Jodensavanne and other parts of the country is the River Surinam, except for a dirt road leading from Jodensavanne to the River Coesewijne area. It is evident that an industrial community needs land transport facilities and that an all-weather road will have to be constructed, preferably branching off the new highway from Paranam to Brokopondo. The length of the road would be approximately 10 km.

(e) Investment and capital costs

All machinery for a pulp and paper industry in Surinam would have to be imported.

Owing to the long freight distances involved approximately 10 per cent must be added to the f.o.b. value of the machinery to cover the costs of packing, freight and insurance.

Custom duties on machinery are generally 3 per cent, but special mining machinery, for instance, is duty-free, and it is very likely that the machinery for a new large-scale export industry will also be exempt.

^{7/} Estimate of the Royal Netherlands Steamship Company.

The Government is considering the introduction of legal measures providing special income tax and customs duty facilities for new investments.

There is a statistics duty of 1/2 per cent on the c.i.f. value of imported goods.

The stable economic and political situation of Surinam is a factor which may make it possible to obtain long-term foreign credits at low interest rates.

(f) Marketing possibilities

As stated before, the Surinam market is too limited to justify a modern paper industry based on local needs. When analysing the export possibilities, it has to be kept in mind that the products which a pulp and paper industry in Surinam could offer on the world market are of a fairly new type and that there are no international price quotations or established demand for pulp or paper from tropical hardwoods.

The possible marketing areas are:

- (i) Central America and the Caribbean area
- (ii) United States of America
- (iii) Europe
- (iv) South America

(i) Central America and the Caribbean area

Within the framework of the Central American common market, one large-scale paper and/or pulp mill is contemplated (Honduras). If this project is carried out there is very little hope that any new type of external production can be placed on this market.

In 1957, this area's imports were as follows:

Newsprint	12 900 tons
Printing and writing papers	11 900 "
Kraft paper	6 200 "
Other papers and board	7 200 "

This area already has one paper mill with expansion plans, the production of which will be protected. It is very unlikely that Surinam production could capture a significant part of this market.

In the other Caribbean area, Cuba will shortly become self-sufficient in pulp and paper products to a very great extent. In the other Caribbean countries, paper and board imports in 1957 were as follows:

/Total

	<u>Total</u>	
Dominican Republic	6 750 tons	
Haiti	6 000 "	
Federation of West Indies	20 000 "	
British Guiana	5 900 "	
Surinam	600 "	
Netherlands Antilles	2 100 "	(+ 1 800 tons of converted products)
French possessions	3 300 "	
Puerto Rico	20 000 "	

In this area, one pulp and paper mill is planned in Trinidad, which has a good supply of bagasse that can easily be collected on a mill site as well as its own petroleum and natural gas production.

Puerto Rico's imports are and most certainly will be mainly from the continental United States.

In the Caribbean area there are no possibilities of placing exported pulp from Surinam and only a slight hope of placing 1 000 or 2 000 tons of wrapping and/or printing and writing papers, provided that price and quality are competitive.

(ii) United States of America

The United States market is the largest in the world and thus, from many points of view, very attractive. Its price, however, is generally low, and it is highly competitive.

Future paper and board (excluding newsprint) demand has been estimated to increase by approximately one million tons annually, (from 23.7 million tons in 1955 to 33.1 million tons in 1965 and to 43.7 million tons in 1970^{8/}), and, on the whole, pulp consumption will probably keep pace with the expansion of paper consumption.

This seems to offer possibilities for new suppliers, but it has to be borne in mind that the United States production potential is very high and that the traditional outside supplier of the United States market is the steadily expanding Canadian industry.

In the United States pulp and paper trade, the tendency has been towards a slight increase in net imports of paper - the major share being newsprint mainly from Canada -, and a slight decrease in dependence on pulp imports.

8/ Report of the World Consultation on Pulp and Paper Demand, Supply and Trade, FAO, 59/9/6788.

The North American region is now a net exporter of pulp (mainly bleached grades) and paper (mainly newsprint).

Though the data for United States Imports in 1957 already reflects the beginning of the 1957-58 recession and the rather sudden appearance of excess domestic production capacity, the figures may still serve to depict the role of overseas suppliers to the United States Market:

Table 1
UNITED STATES IMPORTS OF SELECTED GRADES, 1957
(Thousands of tons)

	Total	Overseas	Overseas imports as a percentage of total supply
Bleached paper pulps	936	106	1.5
Newsprint	4 739	159	2.3
Printing and writing papers	45	8	0.2
Other papers	48	43	0.8
of which, wrapping papers	35	33	0.8
Paperboard	44	22	0.2

Overseas imports are thus very small and of a marginal character only. This does not, of course, preclude the possibility of placing additional amounts on these markets, but it should be stressed that it might be very difficult to do so. It has, moreover, to be remembered that the consumption of market pulp has stagnated (from 1937 to 1958 it increased only 6.5 per cent) and in the case of papers the customs duties for printing papers are 0.25 dollar cents/lb + 10 per cent ad valorem, for writing papers 3 dollar cents/lb + 15 per cent ad valorem and for wrapping papers 30 per cent ad valorem.

(iii) Europe

Europe (excluding Eastern Europe) has been a net exporter of pulp and paper.

Within Europe, however, there are radical differences between the northern region and other parts. While the annual average for Western

/Europe in

Europe in 1956-57 showed net exports of pulp to the amount of 264 000 tons, the balance for the Scandinavian countries was 4 503 million tons and the other countries showed net imports of 4 239 million tons. For paper the corresponding figures were: net exports from Europe 1 032 million tons, net exports from Scandinavia 2 471 million tons and net imports by the other countries 1 439 million tons.^{9/} The tentative projections of paper (excluding newsprint) consumption in Western Europe indicate that it will increase from approximately 10.5 million tons in 1955 to approximately 15.5 million tons in 1965 (another estimate shows 16.75 million tons for this year and to approximately 21.2 million tons in 1975.^{10/}

The estimated balance between projected normal capacity and projected demand indicates^{10/} that in Western Europe in 1965 there will be a slight surplus in other papers excluding newsprint and board, and a surplus of 1.66 million tons of paper pulp.

Since a considerable part of the anticipated increment in capacity will be built in the Scandinavian countries the great difference between the subregions in Western Europe will continue to exist.

Though the Western European paper industry (excluding Scandinavia) is expected to expand, it is very doubtful whether the pulp industry can increase its production to any great extent. The pulp industry is already importing over 30 per cent of its pulpwood needs and, in view of the large expansion of the industry planned in Scandinavian countries (an additional 3.5 million tons by 1965), which have been the main pulpwood suppliers to Western Europe, it is unlikely that any large additional amounts of imported pulpwood will be available for the pulp industry of other Western European countries.

A very important factor for the planned pulp and paper industry in Surinam is the formation of the Common Market in Europe.

^{9/} World Consultation on Pulp and Paper Demand, Supply and Trade, op.cit.

^{10/} Report of the World Consultation on Pulp and Paper Demand, Supply and Trade, op.cit.

The Common Market countries all have pulp and paper deficits. Domestic industry will be protected against international competition by a common customs barrier of 5 per cent on newsprint and of 14 to 21 per cent on other papers on which agreement has been reached. The pulp duty remains to be negotiated.

Imports of paper and board (except newsprint) effected by the Common Market countries from outside the area in 1957 were approximately 744 000 tons, and imports of chemical pulp approximately 1 466 tons.

If Surinam has access to this area, production will find a "home market", with large consumption requirements and protection for paper, at least against international competition.

Another development which is of paramount importance for planned production in Surinam is the outcome of the free-trade area negotiations in Europe. The Free-Trade area between the "outer seven" will not have any significant effect on the marketing possibilities of Surinam production in the common market area. However, if the common market area and the free-trade area of the "outer seven" are merged in future, the common market area will have to face competition from Scandinavia and Austria in the field of pulp and paper.

(iv) South America

Of the South American republics, Colombia will probably soon be self-sufficient in pulp and paper (except newsprint, speciality papers and long-fibre pulp).

In Venezuela the rapid increase in the gross national product and per capita income, combined with educational activities, have raised paper consumption at a higher rate than in any other Latin American country. Though it is assumed that this trend will slacken somewhat in future, the projected per capita consumption of paper will reach approximately 60 kilos by 1970.

At present the Venezuelan paper industry produces wrapping, sack and sanitary papers, linerboard and cardboard. In spite of the industry's plans for expansion, about half the requirements of these grades have to be imported and will probably amount to nearly 100 000 tons in 1965.

/All printing

All printing and writing papers are imported; they were approximately 20 000 tons in 1957 and will increase in 1965 to over 30 000 tons.

The Venezuelan paper market is, however, very competitive and in addition any domestic production will be protected. Three countries are major suppliers of paper and paper products to this market. Except in the case of newsprint, of which Canada is the leading supplier, the United States dominates the market in respect to every type of paper. The third exporter of some importance has been Sweden.

Pulp imports consist of long fibres for wrapping paper and linerboard.

Both Brazilian and Argentine imports comprise at present about 130 000 - 150 000 tons of long fibre pulp, 120 000-70 000 tons of newsprint, and 20 000 - 30 000 tons of printing and writing papers annually.

Brazilian consumption and production are expanding, and Brazil is likely to become completely self-sufficient in most grades, importing some long-fibre pulp and newsprint only.

Argentina's latent import needs are much higher than the statistics indicate. Consumption is suppressed owing to a shortage of foreign exchange and resulting import restrictions.

The forthcoming free-trade area in the southern zone of South America will give Chilean exports a favourable position. Moreover, with regard to marketing possibilities, it should be remembered that Finland and Sweden, the main exporters to Brazil and Argentina, have had trade agreements with both these countries for a long time.

Conclusions

Of the areas mentioned above, the Common Market area in Western Europe seems to offer the best possibilities for marketing Surinam production, if Surinam can obtain access to it. In order to do so, it would be necessary for a mill in Surinam to maintain close contact with an established firm which has marketing outlets in Western Europe, and a detailed market study would be required.

2. Estimates of investment and production costs

The investment cost estimates presented in annex 3 are of a superficial nature and are not intended to do more than show the magnitude of the investments required. Forest investments are not included in these figures.

Three alternatives are considered: (a) a soda-sulphur mill, with its own electrolytic plant, producing approximately 200 tons/day bleached pulp; (b) a sulphate pulp mill producing approximately 200 tons/day unbleached pulp and converting it, with an admixture of 25 per cent imported long-fibre pulp into wrapping paper, and (c) a 200 tons/day sulphate pulp mill with an electrolytic plant, bleaching 50 per cent of its production and converting that part with an admixture of 15 per cent of imported bleached long fibres into printing and writing papers; the remaining 50 per cent of its production is unbleached and is converted, with an admixture of 25 per cent of imported long fibres, into wrapping papers.

In alternative (a) the mill would produce all the chlorine needed for bleaching operations, approximately 95 kg/ton of pulp or, in this case, about 19 tons/day. At the same time the electrolytic plant would produce approximately 1.03 tons of caustic soda per ton of chlorine, or approximately 19.6 tons per day. The cooking and bleaching operations would require about 85 kg NaOH/tons of pulp or 17 tons/day. The mill would thus have a caustic soda surplus amounting to approximately 2.6 tons/day which it might be able to sell.

In alternative (b) all the chemicals needed for operations would be imported.

In alternative (c) the mill would import salt cake for cooking liquor but would produce chlorine for bleaching. Since, in this case, production of bleached pulp would be 100 tons/day, chlorine production, and consumption, would be approximately 9.5 tons/day. The production of caustic soda would be about 9.8 tons/day, of which 5 tons would be used in bleaching, thus leaving 4.8 tons/day to be placed somewhere else in the country. (The 40 000 tons/year aluminum smelter in Paranam will probably need approximately 4 300 tons of NaOH/year.)

/Table 2

Table 2
CAPITAL REQUIREMENTS
(Thousands of dollars)

	Alternatives		
	a	b	c
1. Equipment	12 909	15 594	17 916
2. Buildings, etc.	5 650	7 480	8 210
A. <u>Mill ready for operation</u>	<u>18 559</u>	<u>23 074</u>	<u>26 126</u>
3. Spare parts (5 per cent of 1)	645	780	896
4. Capital cost during construction (12 per cent of A)	2 220	2 769	3 135
5. Working capital (value of 4 months' production)	2 400	4 000	5 000
B. <u>Total requirements</u>	<u>23 824</u>	<u>30 623</u>	<u>35 137</u>

The production cost estimates presented in annex 4 are calculated on the basis of 60 000 tons/year production in alternative (a), 75 000 tons/year in alternative (b) and 72 000 tons per year in alternative (c). The rate of interest has been estimated as 6 per cent, and it has been assumed that 80 per cent of the mill investment would be borrowed capital.

It must be stressed that these estimates are of a general nature only, and need detailed verification before any important decisions can be taken.

According to the estimates, production costs, including depreciation and interest on borrowed capital, would be approximately 113 dollars ton for bleached pulp, approximately 155-162 dollars ton for wrapping paper (75 per cent short fibre, 25 per cent imported long fibre), and approximately 177 dollars ton for bleached papers (85 per cent short fibre, 15 per cent imported fibre).

3. Tentative evaluation of the economic results of a pulp and paper operation

On the basis of the above-mentioned calculations and on the assumptions that the price would be lower than the present of "traditional" products, that the products could find markets in Western Europe and that they would be exempt from duties, the economic results of the various alternatives presented could be as follows (annexes 5, 6, and 7):

/Table 3

Table 3
ESTIMATED ECONOMIC RESULTS
(Excluding taxes)

Alternative	Maximum return on		Minimum time for repaying debts (years)
	Equity capital (percentage)	Total capital (percentage)	
a	loss	2.5	15
b	3.5	5.5	10
c	24.5	9.5	6.5

Alternatives (a) and (b) are not attractive. Alternative (c) seems to give a higher return than that assumed on secure investments, in this case (6 per cent). But only a very detailed market study can reveal whether, and at what cost, it would be possible to place production on the Western European market.

If import duties have to be paid, every operation would result in a loss.

Annex 1
HEAT AND POWER BALANCES

	Bleached soda-sulphur pulp		Unbleached wrapping papers (25 per cent of the fibre requirements are imported)		Bleached papers (15 per cent of the fibre requirements are imported)	
	1 000 k cal	kWh	1 000 k cal	kWh	1 000 k cal	kWh
Heat for cooking	1 100		675		930	
Heat for evaporation	720		540		610	
Heat for bleaching	800		-		680	
Heat for drying	860		1 750		1 750	
Heat for miscellaneous	100		250		200	
Turbine bleeding	675	585	695	605	870	755
	<u>4 255</u>		<u>3 910</u>		<u>5 040</u>	
Total power required		910		900		1 400
Heat produced by recovery unit	2 200		1 460		1 900	
Heat produced by burning waste and bark	415		370		415	
Deficit to be produced by additional fuel	<u>1 640</u>		<u>2 080</u>		<u>2 725</u>	
	4 255		3 910		5 040	
Electricity to be bought		325		295		645

Annex 2

CHEMICAL COMPOSITION OF WATER FROM RIVER SURINAM AT JODENSAVANNE
(Test place: 50 m from the shore, 100 m north of the Forest Service pier)

	Date of tests, waterstand		
	11 March, 1955 1 030	14 March, 1955 1 030	20 March, 1955 1 400
Colour	light yellow	light yellow	light yellow
pH	6.7	6.8	7.0
Suspended matter	6.1 mg/l	9.0 mg/l	16.5 mg/l
Free carbon dioxide	5.4 mg/l, CO ₂	5.8 mg/l, CO ₂	...
Free chlorine	absent	absent	...
Total hardness	0.64° dH	0.62° dH	...
Drying residue	61.7 mg/l	56.0 mg/l	53.3 mg/l
Ignition residue	35.5 mg/l	28.0 mg/l	15.2 mg/l
Chlorides	9.0 mg/l, Cl ₂	9.0 mg/l, Cl ₂	6.2 mg/l, Cl ₂
Iron	1.0 mg/l, Fe	0.5 mg/l, Fe	0.5 mg/l, Fe
Manganese	absent	absent	absent
Sulphates	absent	absent	absent
Soluble silica	10.4 mg/l	7.1 mg/l	3.4 mg/l

Annex 3

INVESTMENT ESTIMATES a/ FOR

- (a) 200 TONS/DAY BLEACHED SODA-SULPHUR PULP MILL
 (b) INTEGRATED MILL PRODUCING 200 TONS/DAY UNBLEACHED SULPHATE PULP AND CONVERTING IT TO 250 TONS WRAPPING PAPERS
 (c) INTEGRATED MILL PRODUCING 200 TONS/DAY SULPHATE PULP (OF WHICH 100 TONS BLEACHED) AND CONVERTING THESE TO 115 TONS OF BLEACHED PRINTING AND WRITING PAPERS AND 125 TONS OF WRAPPING PAPERS

(Thousands of dollars)

	Alternatives		
	a	b	c
<u>Machinery</u>			
Wood handling system	350	350	350
Bark handling system	40	40	40
Chippers, screens and storage	150	150	150
Cooking and blowing departments	650	650	650
Knot screening, pulp washing and storing	330	330	330
Screening department	280	280	280
Bleaching department	1 000	-	600
Secondary screening	400	400	400
Drying machine with auxiliaries	1 700	-	-
Evaporation	40	40	40
Recovery boiler	1 200	1 200	1 200
Causticizing and lime kiln	530	530	530
Stock preparation system and broke recovery	-	350	4 400
Paper machine (s) and machine room auxiliaries	-	4 500	5 200
Finishing department and paper storage	-	300	400
Electrolytic plant	1 100	-	700
Power plant	1 600	2 000	2 100
Piping and insulation	220	300	330
Shops and stores	280	300	300
Fire protection	50	50	50
Office and laboratory equipment	70	70	70
Ocean freight and insurance	969	1 184	1 376
Total	11 419	13 784	15 896
<u>Other costs</u>			
Excavation and planning of site	380	400	400
Cost of erection	640	780	900
Administration during building	220	250	290
Cost of buildings, chests, etc.	3 800	4 700	5 100
Houses for staff and workers	1 000	1 800	2 000
Engineering fees	1 100	1 360	1 540
Total	18 559	23 074	26 126
of which: Equipment	12 909	15 594	17 916
Buildings	5 650	7 480	8 210

a/ Estimates based on information presented in Chile, Potential Pulp and Paper Exporter, on estimates of Stadler, Hunter & Co., Consulting Engineers, and on direct information from machinery manufacturers.

Annex 4

Annex 5

ESTIMATED INCOME AND PROFITS FOR FIRST YEAR OF PULP OPERATION

	<u>Dollars</u>
1. Income from sale (c.i.f. European port) 60 000 tons at 132 dollars <u>a/</u>	7 920 000
2. Sales cost	
(a) Total cost of manufacturing 60 000 tons at 113 dollars	6 780 000
(b) c.i.f. from Jodensavanne to European port 60 000 tons at 22 dollars	1 320 000
(c) Sales expenses 4% of 7,92 million	317 000
	<u>8 417 000</u>
Net operating deficit for the first year (before taxes)	497 000
<u>Total corporate cash flow</u>	
Depreciation	1 314 000
Deficit	497 000
	<u>817 000</u>

The corporate cash flow can be used for repayment of debts, for dividends or for building up a cash surplus.

If used for repayment, the loan capital could be amortized in 15 years.

The operation shows a deficit after the interest (6 per cent assumed) on the borrowed capital has been paid. The equity capital (20 per cent of the mill investment) cannot expect any return.

In addition, if this product has to carry customs duties when exported to the common market area, the income from sales will decrease. A 3 per cent duty would decrease the income by approximately 230 000 dollars.

a/ Present price c.i.f. European port for bleached Scandinavian hardwood sulphate is 147 dollars. 10 per cent discount has been assumed on new products.

Annex 6

ESTIMATED INCOME AND PROFITS FOR FIRST YEAR OF WRAPPING PAPER OPERATION

	Dollars
1. Income from sale (c.i.f. European port) 75 000 tons at 192 dollars <u>a/</u>	14 400 000
2. Sales costs:	
(a) Total cost of manufacturing 75 000 tons at 155 dollars	11 625 000
(b) c.i.f. from Jodensavanne to European port 75 000 tons at 23 dollars	1 725 000
(c) Sales expenses 6% of 14 400 000 dollars	864 000
	<u>14 214 000</u>
Net operating profit for first year, before taxes	186 000
<u>Total corporate cash flow</u>	
Depreciation	1 598 000
Net operating profit before taxes	186 000
	<u>1 784 000</u>

If the total corporate cash flow could be used for repayment of debts, these would be amortized in 10 years.

If the net profit could be used for dividends it would give a return of 3.5 per cent on assumed equity capital (20 per cent of the investment).

In addition, it should be remembered that if customs duties have to be paid on exports to the common market area, the income from sales will decrease by approximately 15 per cent or by 2.1 million dollars and the operation will thus result in a loss.

a/ Present price c.i.f. European port new products duties paid, for Scandinavian kraft paper is 240 dollars. A 20 per cent discount is assumed on new products.

Annex 7

ESTIMATED INCOME AND PROFITS FOR FIRST YEAR OF COMBINED WRAPPING,
PRINTING AND WRITING PAPER OPERATION

	Dollars
1. Income from sales (c.i.f. European port)	
37 500 tons wrapping paper at 192 dollars	7 200 000
34 500 tons printing and writing papers at 264 dollars <u>a/</u>	9 108 000
	<u>16 308 000</u>
2. Sales costs:	
(a) Total cost of manufacturing	
37 500 tons at 162 dollars	6 075 000
34 500 tons at 177 dollars	6 106 000
	<u>12 181 000</u>
(b) c.i.f. from Jodensavanne to European port	
72 000 tons at 23 dollars	1 676 000
(c) Sales expenses	
6% of 16 308 000 dollars	978 000
	<u>14 835 000</u>
Net operating profit for first year excluding taxes	1 473 000
<u>Total corporate cash flow</u>	
Depreciation	1 852 000
Net profit before taxes	1 473 000
	<u>3 325 000</u>

If the total corporate cash flow could be used for repayment of debts, these would be amortized in 6.5 years.

If the net profit could be used for dividends it would give a return of 24.4 per cent on assumed equity capital (20 per cent of the investment).

However, it should be remembered that if customs duties have to be paid on exports to the common market area, the picture changes essentially. The income from sales of wrapping paper would decrease by approximately one million dollars (assuming 15 per cent duty), and from sales of printing and writing papers by approximately 1.8 million dollars (assuming a duty of 20 per cent), the total decrease thus being approximately 2.8 million dollars or considerably more than the estimated profit.

a/ Present price c.i.f. European port, duties paid, approximately 310 dollars 15 per cent discount is assumed on new products.

