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MANO RIVER UNION INDUSTRY STUDIES

A UNIDO PROJECT

By Sanderson and Porter, Inc.

FS 458

MANO RIVER UNION INDUSTRY STUDIES

FINAL REPORT

C|F

REQUIREMENTS FOR PRE-FEASIBILITY STUDIES OF UNION INDUSTRIES IN LIBERIA AND SIERRA LEONE

Submitted to
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
(UNIDO)
Vienna, Austria

UNIDO CONTRACT 75/29

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PRECIS

This report presents the results of an economic examination by a team of industrial consultants of eighteen suggested import substitution manufacturing "Union Industries" to serve the Mano River Union Common Market of Liberia and Sierra Leone. Four proposed export industries were also examined. The study includes, in addition to an analysis of the industrial markets, resources and infrastructure, a review of the status of the few existing manufacturers in each country as a basis for judging the economic viability of the proposed industries. It was found that the small markets of the two countries were not the major economic disability of modern manufacturing industry, but rather the universal requirement that every enterprise support the high cost of expatriate technical and financial management. Nine of the industries, including textiles glass containers, tires and agricultural implements, are recommended for possible development as Union Industries and four, namely iron and steel, alumina, paper pulp and plywood as export industries. Eight of the industries were not recommended for Mano River Union support at this time because of market or raw material shortcomings or, as in the case of sugar, because they are already being developed as domestic industries not requiring common market support or protection. Pre-feasibility studies are now required to further the development of four of the recommended industries; glass containers, Sardinella fishing and processing, paper pulp and plywood.

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SECTION I

INTRODUCTION

Project Objective

The aim of this Project performed by Sanderson & Porter, Inc. of New York for UNIDO (Contract 75/29) is to carry out pre-feasibility evaluations of "Union" manufacturing industries to be developed jointly by Liberia and Sierra Leone to supply their common market. The terms of reference for Phase I of the study, covered by this report, called for a preliminary economic evaluation of twelve manufacturing industries to select those deemed most capable of economic development as Union Industries and determine which of these required pre-feasibility studies to further their development. The twelve industries were:

Sugar	Pulp and paper
Fiber bags	Wood-based industries
Fruit and vegetable processing	Agricultural implements and allied metal products
Rubber products	Textiles
Cassava pellets and chips	Salt
Edible oils and oil seed processing	Aluminum domestic utensils

In addition to the economic review of the above, consideration was given to the identification of other possible "Union Industries". Six such industries were appraised, including:

Cement

Glass containers

Soap and detergents

Fertilizer

Dry cell batteries

Sardinella fishing and processing.

The Secretary-General of the Mano River Union, Dr Cyril Bright, also requested that the Study Team provide an evaluation of some of the export industry possibilities observed in the two countries. Thus, in addition to all the foregoing four potential export industries were evaluated, namely:

Iron and steel - Liberia

Alumina - Sierra Leone

Paper pulp - both countries

Plywood - both countries

Statement of Work Performed

This Phase I Report ineludes an analysis of eaeh of the proposed industries to provide a:

1) reappraisal of their economic viability and,

2) a recommendation of the preliminary location for each industry considered viable, with regard to maximizing the eeonomie benefits of the industry while taking into aecount the principles of equitable distribution of benefits between Sierra Leone and Liberia.

The list of recommended industries and location is presented in Section III.

The Study Team reviewed and analyzed available information on past efforts to develop manufacturing industries, the diffieulties that were eneountered, and their impaet on current plans for new industrial development. This analysis is presented in Sections IV, V and VI.

The industrial evaluations required a review oi the existing information on loeal conditions for manufacturing industry including:

1) locally produced raw materials;

2) existing or potential plant sites and their environmental conditions;

3) water supply and sewerage faeilities;

4) transport and communieation services;

5) eleetric power supply;

6) the need to house labor; and

7) other factors relevant to industrial location decisions; and has:

8) established the comparative costs of domestic and foreign procurement of capital goods and civil works;

9) the availability of local civil works; engineering and design expertise; and the availability of local capital inputs;

10) an assessment of the local financial resources that may become available for industrial development and the channels through which they are made available.

The Study Team prepared market forecasts for the products of the industries examined for the next ten years in both countries, based upon the following information:

a) the available data on imports, exports and domestic consumption of the products of the lis ed industries in Liberia and Sierra Leone including trends during the past decade;

b) the available data on raw material supplies and the nature of the markets for the industries examined;

c) the terms and conditions of existing and proposed trade agreements which may affect the marketing of products of the listed industries; and

d) other factors which the Study Team deemed relevant to the future market potential of the industries examined.

The economic analyses of each of the recommended "Union Industries" is presented in Section VII. Section VIII in turn contains the analyses of the export industries and Section IX those not recommended for Union Industry status at this time.

The concluding Section X of the report presents the recommendations for Phase II pre-feasibility studies of the four industries that we feel require such study and a continued review of additional Union Industry proposals.

Monetary and Weight Units

The Sierra Leone currency unit is the Leone which has been maintained by the Central Bank at par with 50 cents of the UK Pound. By the end of 1975 the Leone had declined in value to approximately equal the U.S. Dollar which is national currency of Liberia. Sierra Leone's currency is subject to exchange control; Siberia's is not. Differences are discussed in Section V.

Both countries continue to use pounds and long tons as the most common measures of weight. However, the data utilized in this report has been converted to metric tons, except where noted.

Study Team and Work Program

Sanderson & Porter's Team responsible for this project was directed by Stanton R. Smith, an industrial engineer/economist with twenty years experience in industrial development programs in Africa, Latin America and Asia. Mr. Smith was assisted by Mr. William A. Hammond, Marketing Consultant. The field work in Sierra Leone and Liberia was conducted during the period September to December, 1975. The industry analyses developed by the Study Team were reviewed by the firm's industrial engineers and consultants and this report prepared in Sanderson & Porter's New York offices in January and February 1976.

The Study Team wishes to express its thanks for the assistance rendered by Dr. Cyril Bright, Secretary-General of the Mano River Union and his staff in the Secretariat Headquarters in Freetown. The team is also grateful for information supplied by the many government officials in Sierra Leone and Liberia and the United Nation's advisors in both countries. Among the latter special appreciation is extended to the following: UNDP Resident Representative to Sierra Leone, Dr. William A. Harper; the UNIDO advisors in the Sierra Leone Ministry of Planning, Messrs. Rauol Jofre and Andrew Nickson, Librarian, Ms. Judy Coomes, and Mr. Jovanovich in the Liberian Ministry of Industry. In addition Mr. Lincoln Randall, UNIDO's regional advisor, provided a useful review of this Report. The cooperation of all is greatly appreciated.

SECTION II

SUMMARY AND CONCLUSIONS

The purpose of this UNIDO project is to prepare pre-feasibility studies of proposed import substitution manufacturing industries capable of economic development to supply a Mano River Union Common Market formed by Liberia and Sierra Leone. The Terms of Reference for the First Phase of the study covered in this report required an economic review of 12 industries to select those deemed economic; and, of these, the industries requiring pre-feasibility studies to further their development. The Secretary General of the Mano River Union, Dr. Cyril Bright, requested that the Study Team include in their review other Union and export industry possibilities in the two countries. The Study Team was able, within the time available, to review 10 additional industries, including 4 major export industry projects. The 22 industries studied are listed in Table II-1.

The Status of Existing Manufacturing Industry in Liberia and Sierra Leone

The status of existing manufacturing industries in the two countries was examined by the Study Team in order to assist in appraising the likelihood of successfully establishing Union Industries in the two countries. (See Sections IV to VI). Manufacturing industry in both countries consists of a handful of high-cost, protected, foreign-owned and managed firms. The governments have offered generous incentives in their attempts to attract foreign private investors, with some success in the 1960's, but with virtually no success for import substitution industries during the last five years.

Both Monrovia and Freetown have the basic infrastructure, and unskilled work force required for new light manufacturing industries. Sierra Leone's existing manufacturing industry is more developed than Liberia's and there is a larger skilled work force. However, both countries suffer the same major economic disability; all manufacturing industry must support the high cost of expatriate management. This burden can be borne by the few large-scale export processing or mining industries, or by economic import-substitution industries such as the brewery, soft drink, soap and cigarette industries. However, the high cost of two or three expatriate personnel places an insurmountable economic burden on smaller-scale industries, which must, therefore, be protected. Foreign manufacturers are not interested in risking equity capital in these politically vulnerable industries whose survival requires the continued protection of the Government. As a result, the only proposals to establish new manufacturing industries received in both countries in recent years are those of equipment supplier firms or promoters, risking no capital themselves.

Industries Recommended for Possible Development as Mano River Union Industries

The Study Team reviewed existing information on resources and markets for the industries proposed for development as "Union Industries" to serve the Mano River common market of Liberia and Sierra Leone. Nine of the industries reviewed were considered economically feasible for development in the near future. Eight of the

TABLE II-1

SUMMARY OF MANO RIVER UNION INDUSTRY RECOMMENDATIONS

Industry	Location	Estimated Capital cost, mil $	Number of Employees	Pre-Feasibility Study Required
Industries Recommended for Possible Union Industry Status				
1. Glass Container	Either Country	3.0	76	Yes
2. Rubber Tire	Liberia	30.0	1298	No
3. Salt (from Seawater)	Sierra Leone	1.0	164	No
4. Detergent Manufacturing	Liberia	1.0	32	No
5. Agricultural Implements	Sierra Leone	2.0	156	No
6. Textile Printing	Sierra Leone	5.3	293	No
7. Synthetic Textile Weaving	Liberia	2.0	153	No
8. Dry Cell Battery	Either Country	2.0	37	No
9. Sardinella Fishing	Sierra Leone	1.5	93	Yes
Export Industries Recommended for Mano River Union Support				
1. Iron & Steel	Liberia	700.0	4,300	No
2. Alumina	Sierra Leone	400.0	2,200	No
3. Paper Pulp (Gola Forest)	Both Countries	100.0	2,050	Yes
4. Plywood (Gola Forest)	Both Countries	30.0	1,230	Yes

Industries not Recommended for Union Industry Status at this Time

Industry	Reasons for Rejection
1. Cassava Pellets	Market Limitations
2. Industrial Sacks	Domestic Market and Raw Material Limitations
3. Fruit, Vegetable Canning	Raw Material Limitations
4. Edible Oil Seeds	Existing national industry and domestic market limitations
5. Sugar	Existing national projects in hand.
6. Cement	Existing national clinker grinding industry and no limestone for domestic clinker manufacture.
7. Fertilizer	Market and Raw Material Limitations.
8. Aluminum Utensils	Market and Cost limitations.

industries were not recommended for Mano River Union support at this time for various reasons including market or raw material shortcomings, or, as in the case of sugar, because the industry is already being developed as a national industry and does not require protection, or union market support. The industries recommended for possible development as Union Industries are listed in Table II-1, along with an order-of-magnitude estimate of capital cost and number of employees; the industries not recommended are also listed along with the major reasons for rejection.

Location of Recommended Union Industries

The location of seven of the nine potential Union Industries was dictated by the economics of location of their raw material supply or their markets, or, as in the case of agriculture implements and detergents, because of the location of an existing plant and facilities and/or labor force. Two of the possible industries, glass containers and dry cell batteries, might be located in either country without significant economic disadvantage.

It is considered important to provide an economic balance between the two countries of the benefits derived from the development of the proposed Union Industries. Preliminary estimates of capital cost, employment, value of sales and Domestic Value Added were made for each of the recommended Union Industries to provide a rough measure of their economic benefits to the two Governments. The benefits to be derived from industry location are summarized and tallied for each country in Section III of the Report, and are described in more detail in the analysis of each industry included in Section VII.

Recommended Second Phase Industrial Study Activity

Pre-feasibility studies are required to further the Mano River Union's development efforts in the four recommended industries: glass containers, Sardinella fishing, and paper pulp and plywood based upon the Gola hardwood forests bordering the Mano River. For the other recommended industries, adequate pre-feasibility studies exist to support the Mano River Union's industrial promotion efforts with potential investors.

In addition, because time limitations precluded an adequate review of all possible Union Industries during this First Phase, the Second Phase should include a continued review of additional Union Industry proposals.

SECTION III

RECOMMENDATIONS FOR UNION INDUSTRIES AND REQUIREMENTS FOR PRE-FEASIBILITY STUDIES

The industries recommended for possible consideration as Mano River Union Industries or for Mano River Union support have been selected because the consultants found that they might be viable and economic industries. Table III-1 presents for the industries recommended, preliminary gross estimates of possible economic benefits, which may derive from their location. These estimates include the volume of new employment, volume of capital investment, annual sales and estimates of imported raw material costs to provide an approximation of Domestic Value Added.

Eight of the industries examined were not recommended for Union Industry status at this time. They are also listed in Table III-1 and the reasons are provided in Section IX.

Industry Location Based on Raw Materials, Existing Plant and Markets

For a number of the recommended industries the location is dictated by economic considerations, including available raw materials, existing facilities, or market location. Because of the overriding importance of the aforementioned factors in the location of the industry, the consultants were of the opinion that there could be no alternative or secondary location for them (i.e. Liberia versus Sierra Leone).

Those industries whose raw material supply dictated location included iron and steel, alumina, rubber tires, paper pulp and plywood.

Iron ore deposits exist in both countries, but only Liberia has an active export industry, and it has many times the reserves of Sierra Leone. For this reason Liberia was chosen for the site of this industry.

The reverse situation holds for alumina. Sierra Leone has good, proven bauxite reserves, some of which are now being exported. Liberia has no bauxite mining activity. Therefore, Sierra Leone is the only possible location for this industry.

In the case of rubber tires, the largest commercial rubber plantations within the Union are located in Liberia. These are owned by the major U.S. tire manufacturers, Firestone, B.F. Goodrich, and Uniroyal. Since any rubber tire plant must be established in partnership with an outside firm, such as Firestone, who has access to adequate markets and is capable of producing a product of adequate quality to enter these markets, only Liberia might influence one of these firms to invest.

Location of the paper pulp and plywood industries based on the Gola Forests in the Mano River basin will be determined by the available forest reserves. These industries may be located in both countries with the final determination resting on the verification of the quality and amount of forest reserves available and infrastructure.

TABLE III-1

POSSIBLE MANO RIVER UNION AND EXPORT INDUSTRIES, ESTIMATE OF ECONOMIC BENEFITS, AND STUDY REQUIREMENTS

Industry	Tentative Location	Volume of New Employment	Capital Investment, Millions US $	Annual Sales Millions US $	Value of Imported Raw Materials, Millions US $	Prefeasibility Study Required*
Recommended Possible Union Industries						
1. Glass Container	Either Country	70 Workers 6 Managers	3.0	4.4	0.7	Yes
2. Rubber Tire	Liberia	1250 Workers 48 Managers	30.0	20.0	10.5	No
3. Salt (from Seawater)	Sierra Leone	160 Workers 4 Managers	1.0	0.6	0.1	No
4. Detergent Manufacturing	Liberia	30 Workers 2 Managers	1.0	1.3	0.5	No
5. Agricultural Implements	Sierra Leone	150 Workers 6 Managers	2.0	2.5	0.9	No
6. Textile Printing	Sierra Leone	285 Workers 8 Managers	5.3	7.5	1.7	No
7. Synthetic Textile Weaving	Liberia	150 Workers 3 Managers	2.0	2.0	0.5	No
8. Dry Cell Battery	Either Country	35 Workers 2 Managers	2.0	2.0	0.9	No
9. Sardinella Fishing and Processing	Sierra Leone	90 Workers 3 Managers	1.5	1.8	0.3	Yes

TABLE III-1 (Continued)

Industry	Tentative Location	Volume of New Employment	Capital Investment, Millions US $	Annual Sales Millions US $	Value of Imported Raw Materials, Millions US $	Prefeasibility Study Required*
Export Industries						
1. Iron & Steel	Liberia	3500 Workers 800 Managers	700.0	675.0	120.0	No
2. Alumina	Sierra Leone	2000 Workers 200 Managers	400.0	100.0	20.0	No
3. Paper Pulp	Both Countries	2000 Workers 50 Managers	100.0	100.0	20.0	Yes
4. Plywood	Both Countries	1200 Workers 30 Managers	30.0	20.0	5.0	Yes

Industries not Recommended For Union Industry Status at this Time

	Reasons for Rejection
1. Cassava Pellets	Market Limitations
2. Industrial Sacks	Domestic Market and Raw Material Limitations
3. Fruit and Vegetable Canning	Raw Material Limitations
4. Edible Oil Seeds	Existing national industry and domestic market limitations.
5. Sugar	Existing national projects in hand.
6. Cement	Existing national clinker grinding industry and no limestone for domestic clinker manufacture.
7. Fertilizer	Market and Raw Material Limitations.
8. Aluminum Domestic Utensils	Market and Cost limitations.

*New prefeasibility studies are not required for most of the industries because they have already been performed.

Plants already established, or in the process of being established, determined the location of the agricultural implement, salt, synthetic textile weaving, sardinella fishing and detergent manufacturing industries. The old railway workshop in Freetown was recommended as the facility for the agricultural implement production. Salt evaporation works have already been constructed in Sierra Leone which determines the site of this industry. The selection of Liberia for the location of the detergent manufacturing industry was made because the country already has one company producing detergents. Furthermore, the Mesurado Group in Liberia who monopolize distribution in the industry are unlikely to relinquish their hold on this business. Liberia was also selected for the location of the synthetic weaving industry because of the unutilized plant already located there. Freetown was chosen as the site for Sardinella fishing because of its proximity to Sardinella concentrations and facilities already existing in Freetown.

Market and other raw material considerations favored the location of the cotton textile printing industry. Sierra Leone has the much larger market for textile goods and has a potential for growing cotton to allow later vertical integration in the same plant.

Industry Location Based on Equitable Distribution of Economic Benefits

The accompanying table provides some preliminary gross estimates of possible economic benefits to be derived from plant location. In making the selection for the location of Union Industries, the consultants utilized a rough measure of Gross Domestic Value Added. This criterion was chosen because it measures the principal economic benefits to be gained from the establishment of individual union industries. The Domestic Value Added per annum is approximated by subtracting from annual sales of each industry the annual cost of imported raw materials, including energy. In addition, from this value annual transfers abroad such as interest, rent royalties etc. should be deducted, but as the source of capital is not determined this has been ignored. The cost of foreign transfers from expatriate salaries is ignored for the same reason.

In making the equitable distribution of economic benefits between the two countries, only the benefits of those industries recommended for possible Mano River Union Status need be balanced. Export industries do not depend upon, or require, sacrifices by the other country. The possible Union Industries are glass containers, rubber tires, salt, detergents, agricultural implements, textile printing, snythetic textile weaving, sardinella fishing and dry cell batteries. The location of these industries, with the exception of glass containers and dry cell batteries, is determined by economic considerations and the Domestic Value Added by these industries to the countries in which they are located is shown in Table III-2.

The balance as determined above appears to favor Liberia if all industries are established. This conclusion prevails also for the other estimates of benefits including employment and the volume of capital investment.

TABLE III-2

GROSS DOMESTIC VALUE ADDED, EMPLOYMENT AND VOLUME OF INVESTMENT
OF PROPOSED UNION INDUSTRIES

Industry	Liberian Union Industries			Sierra Leone Union Industries		
	Domestic Value Added* ($ millions)	Employment (nos)	Investment ($ millions)	Domestic Value Added* ($ millions)	Employment (nos)	Investment ($ millions)
Rubber Tires	9.5	1298	30.0			
Detergent Mfg.	0.8	32	1.0			
Salt				0.5	164	1.0
Agricultural Implements				1.6	156	2.0
Textile Printing				5.8	293	5.3
Sardinella Fishing, Processing				1.5	93	1.5
Synthetic Textiles	1.5	153	2.0	____	____	____
Total	11.8	1483	33.0	9.4	706	9.8

	Domestic Value Added* ($ millions)	Employment (nos)	Investment ($ millions)
Glass Containers (footloose)	3.7	76	3.0
Dry Cell Batteries (footloose)	1.1	37	2.0
Total	4.8	113	5.0

*Estimated as value of sales less imported raw materials from Table III-1.

The two remaining industries, glass containers and dry cell batteries, can be considered "footloose", that is, they can be located in either country without significant disadvantage. The rough estimates of Values Added by these industries is also presented in Table III-2. The glass container industry might be located in Sierra Leone and the dry cell battery industry in Liberia to achieve distributive balance.

When there remain imbalances, however, there are other techniques for minimizing the differences such as the joint venture sharing of profits and employment opportunities.

As noted above it is not necessary to tally the economic benefits derived from the location of the export industries recommended for Mano River Union support because they need not be protected, nor depend on the other country for their economic viability, but upon their exports to third countries. The establishment of an export industry in one country thus does not entail any sacrifice by the other; if there is some marketing in the neighboring country, the industry can mount existing tariff walls, and will have a transport advantage delivering goods cheaper than before.

Pre-feasibility studies are required for only four industries: glass containers, sardinella fishing, paper pulp and plywood. The remaining industries do not need pre-feasibility studies under the Mano River Union auspices because either they have facilities already in operation; or pre-feasibility studies have already been performed or will be performed by the interested foreign investors. The reasons for each industry are presented in the individual industry analyses in Sections VII and VIII.

SECTION IV

ENVIRONMENT FOR MANUFACTURING INDUSTRY IN LIBERIA AND SIERRA LEONE

Environment for Industry

The existing modern manufacturing industry in both Sierra Leone and Liberia is meager, consisting in each country of a handful of high-cost, protected, foreign owned and managed firms. Both Governments have offered incentives to attract foreign private investment, with some success in the 1960s, but both industrial economies have stagnated in the last five years. Since then both Governments have tried to start up enterprises themselves with little economic success. A fuller description of the status of existing manufacturing industry in both countries is presented in Sections V and VI.

It is of interest to review the current physical and institutional environment for modern industry in the two countries. The few manufacturing plants in each country are located in the respective capital cities of Freetown and Monrovia. These cities have the infrastructure available for industry. On the outskirts of Freetown is a large industrial estate supplied with all utilities and served by public transportation from the residential areas of the city, where adequate housing exists for those that can afford it. Monrovia's industrial park has never been completed, but adequate sites exist across the lagoon from the city with access to the port, utilities and public transportation.

Water supply and sewerage in both cities are adequate for medium size industry. The public electric utility in each country can connect modest new loads, but they are high-cost small scale thermal generation based systems with unreliable distribution networks. Liberia has a 70 MW hydro station, but it has no firm power because the required upstream storage dam was never built. Instead of completing its hydro-system the Utility over time added a complete duplicating 70 MW of gas turbine generators, and now pays the piper in oil. Sierra Leone has attractive 80 MW dam sites, but has been forced by international financing to remain with small diesel fired generation.

Industries requiring a reliable electric supply must pay the additional cost of standby diesel sets in their factory. Most large scale mining operations in both countries and the new $30 million export plywood mill in Liberia must generate their own supply. With diesel generation costing 8¢ per kwh., competent hydro development would have long ago eliminated this economic waste and foreign exchange cost of oil for both countries.

There is a large available supply of unskilled and semi-skilled labor in both countries with monthly wages ranging from Le40 to Le80 in Sierra Leone and $60 to $100 in Liberia. The supply of skilled workers is more limited in Liberia, but in Sierra

Leone there are hundreds of skilled workers who have lost their jobs in recent years, both at the iron ore mine which finally shut down in October, 1975 and the railway phaseout beginning in 1971.

Local construction contractors in both countries handle smaller civil and heavy construction jobs competently and economically when given adequate engineering supervision. Large scale construction projects are handled in both countries by expatriate managed firms and the costs on major projects appear to approach those in developed countries, in spite of the low local labor costs. (Although some Government contracts have been let at higher uncompetitive prices). Engineering services are limited, except for simpler civil works and structures.

Domestic financial resources of both countries are limited, but each government has made available modest volumes of capital for industrial development through Industrial Development Banks. These institutions and their limited success are described in Section V.

The Sierra Leone Government attempted direct investment in a number of abortive agro-industrial projects beginning in the latter 1960's, utilizing Marketing Board profits. Most were overcapitalized in cooperation with promoters, or equipment suppliers, and bankrupted in operation with the Government left to pay the lenders. Some of these hangovers continue today, but the Government no longer has any surplus to carry them.

The Liberian Government also has failed to generate an adequate surplus to allow it to participate significantly in any major industrial investment. Both Governments therefore depend primarily on foreign capital, directly or indirectly, for any major investments. Few local businessmen, including the Lebanese commercial interests, are disposed to invest in industry. Some of their disappointing experiences in the past are described in Section V.

The poor results of both Governments' attempts to create modern industry have often been attributed to the small markets in each country. Liberia has a population of some 1.5 million, a GDP of $517 million in 1974 and a per capita income of $197. Most of the monetary income is derived, directly or indirectly, from the large-scale foreign owned iron ore and rubber export industries. Sierra Leone has a 3.0 million population, a GDP of $493 million in 1974, and a per capita product of $164. Both countries report a rising real GDP, but falling production statistics, including exports, would lead one to question the reliability of the GDP estimates.

The small markets in the two countries are not, however, the major disability of modern industry. The fact that nearly every enterprise has to support the high cost of expatriate management, both financial and technical, places a difficult burden on the economics of any industry, and an insurmountable burden for small scale enterprises. This is often viewed as a management training problem but there is more. It is also necessary to develop a system of values which respects that capital and labor resources are valuable assets that must be utilized efficiently to increase the income of the enterprise (and the nation), rather than the short term income of the managers.

New enterprises have been conceived by their promoters in recent years more as a means of extracting income in monopoly profits under Government protection, rather than as institutions to create new income.

The high unemployment rates in both countries, including hundreds of skilled workers in Sierra Leone, are the more obvious evidence of the failure to utilize existing economic resources. The commonly proposed solution is to provide additional capital; however, again this is not the entire story. Millions of dollars of existing capital resources lie idle. In each country there are more than a half dozen unutilized manufacturing plants and facilities while the countries import their products. The idle plants in Liberia include the countries only: cigarette factory, detergent manufacturing plant, synthetic textile weaving plant, food canning plant, and large-scale apparel factory. The idle plants in Sierra Leone include the cement clinker grinding plant, the extensive railway machine, forge and foundry shops, oil palm mills, sesame oilseed processing plant, palm kernel oil refining plant, oilseed cake pelletizing plant, alcohol distillery, a metal fabricating plant, a powdered coffee plant, and since October 1975 the country's major iron ore exporting operation, including mines, railway and port.

These are the economic realities, which disable new enterprises in both countries. The combining of the two countries in a Customs Union will not alone overcome them. It will also not lessen significantly the extent of protection required to support marginal import substitution industries utilizing expatriate management and imported raw materials.

The attractive and potentially profitable industrial opportunities in both countries are the export oriented industries which process domestic raw materials. Such industries as the new $30 million plywood mill in Liberia, or Mesurado's Shrimp industry, can supply domestic and Union markets without requiring any protection because their costs are internationally competitive. New sugar industries in each country offer the same promise.

The following paragraphs discuss some of the attractive opportunities for export industry based upon domestic agricultural, forest and mineral resources in the two countries. These export industries were added to our review at the request of the Mano River Union Secretary General.

Agriculture Raw Materials for Industry

The agricultural regime in the two Countries is quite similar consisting primarily of small farmers engaged in subsistence tropical agriculture producing cassava, rice and harvesting of tree crops including wild oil palm. Most farmers, especially in Sierre Leone, supplement their incomes with sales of foodstuffs in local markets, or of a variety of commercial export crops which are purchased by the Government Produce Marketing Boards. In both Countries these commercial products include: coffee, cocoa and palm kernels. Liberia is also one of the world's largest producers of rubber which is exported as latex and crepe. Production is primarily in the hands of

large U.S. firms, including Firestone, Goodrich and Uniroyal. However, large Liberian-owned plantations have been developed and are now processing in a government-owned rubber processing plant. Sierra Leone has also started production of rubber for export from large plantations which are currently being expanded.

These agricultural products offer little opportunity for trade between the two Countries. In both Countries food production, expecially rice, has failed to keep pace with growing urban requirements, and the countries are substantial net importers. (See list of major imports in Annex Table 1.) In response, both Countries have national agricultural programs underway to expand food crops, including rice, aimed at achieving national self-sufficiency.

Pius Okigbo, an UNCTAD Consultant, has pointed out in his study of industrial Joint Ventures among African Countries (TD/B/AC.19/R.3 2 Oct. 75) that the minimum requirements for consideration of a project as a potential international Joint Venture (or Union Industry) are that:

1. "The Project must be of interest to more than one State, i.e. there must be clear economic need to have a market larger than that of one State to obtain the minimum economic scale of operations:

2. "The product must be important for the economy and life of the people of both States, e.g. food or construction materials; and

3. "One or more of the major raw materials must be relatively more abundant in one of the participating States than in the other States".

Thus, in discussing the joint development by the two Countries of Union Industries to serve both markets, it is advisable to concentrate on those industries where one of the other countries has a unique raw material base, whether agricultural or mineral, As both countries are producing virtually the same tropical crops, the opportunities for trade between the countries is limited. Even in the case of those crops which the countries are developing, such as sugar cane, each country has the capability of developing a viable industry to supply its own requirements and to provide an export capability. There will possibly be some opportunity for Liberia to export refined sugar to Sierra Leone after 1978 when their new 12,000-ton-per-year sugar factory commences production. However, a 30,000-ton-per-year project is presently being prepared for Sierra Leone by the Peoples Republic of China to commence initial production by 1980.

Sierra Leone, however, does have a drier tropical Savannah zone inland along the Guinea border where it may be possible to grow some crops to supply new industries required by the two Countries, such as cotton. Some cotton is grown in this region, now supplying the cotton cloth weaving cottage industry. Cotton was introduced in the area over two centuries ago by the British Colonial Government, but never became the desired export success, although a few bales were exported to the U.S. in 1865. A number of agricultural studies dating from the 1950's have been undertaken of the area's potential for commercial cotton production. They have not been encouraging partly because of the limited dry season. An FAO adviser, Mr. Fielding, has recently

re-examined the potential. A small volume of cotton may possibly be grown economically, adequate to supply a cotton cloth weaving industry in Sierra Leone. The minimum economic size cotton weaving and dyeing plant would have an initial output some 15 million yards per year capable of supplying approximately two-thirds of the combined Sierra Leone and Liberia Markets. If this industry also includes cotton yarn spinning production, rather than depending upon imported cotton yarn, it would require over 2,000 tons of lint cotton per year.

Another crop which may be produced in this Sierra Leone Savannah region is a jute substitute, Urena-Lobata. The United Kingdom's Tropical Products Institute has supplied technical assistance for the experimental planting of 91 acres near Newton, and a UNDP Expert, Mr. Nitra, arrived in October 1975 to supervise the program for the next two years. It would take another two years to determine the viability of producing the crop for export by small farmers. However, the United Kingdom has, somewhat prematurely, also recently sent a team of three Experts from P.E. Consulting Group, Limited to examine the West African market for the product for the Ministry of Trade and Industry. If the Ministry of Agriculture proves this crop commercially viable it may, after two or three years, serve as a raw material supply for a domestic industrial sack manufacturing industry capable of supplying the combined Sierra Leone and Liberia markets. Such a plant would produce some three million sacks a year; the Urena-Lobata requirements, in a 50-50 blend with imported jute, would total 1,500 tons per year.

Mineral Raw Materials for Industry

As with agriculture, the geological resources of Sierra Leone and Liberia are also quite similar. Both have significant iron ore deposits, although only Liberia has become a major exporter. Both countries, lacking limestone, are unable to develop a cement manufacturing industry and are restricted to operating imported cement clinker grinding plants. Both countries produce diamonds, although Sierra Leone is the larger producer. Both countries have bauxite deposits, but only Sierra Leone has developed a bauxite export industry of some 700,000 tons per year.

Liberia and Sierra Leone each have projects in hand to develop major export industries based upon processing their respective mineral ores; in Liberia, an export-oriented steel industry, and in Sierra Leone an export alumina industry.

Liberia has exported approximately 25 million tons of iron ore per year since 1971; half of these exports come from the LAMCO Mine at Mount Nimba and are exported from Port Buchanan. The Austrian steel manufacturer, Voest, has proposed constructing a major two-blast furnace integrated iron and steel plant of 1.5 million tons annual capacity at Buchanan. The industry would be supplied with imported coke by a low-cost backhaul in the iron ore carriers. The capital cost of the mill is thereby lowered by the elimination of the coke ovens and by-product plants. Capital costs are further reduced by installing only a minimum small-section rolling mill and a sheet mill aimed at the large African galvanized corrugated roofing sheet market. About three-quarters of the mill's output would initially be exported as continuously cast

slabs and billets to European and African rolling mills. This project is considered economic and is similar to other export-oriented semi-finished steel mills now planned in iron ore exporting countries such as Australia and Brazil. Liberia's mill will be the first for Africa, but mills would eventually follow in other iron ore exporting countries, including Ivory Coast, Angola and South Africa based upon the blast-furnace and L. D. oxygen steel-making technology. In Gabon, where there are also large natural gas deposits, the direct reduction process will be utilized to produce metallized pellets for export to electric steel-making facilities in Europe and other countries of Africa. This industry is described in more detail in Section VIII.

The alumina project in Sierra Leone is based upon bauxite deposits located in a wide belt extending from an area along the railway 50 miles inland from the iron ore export port of Pepel north to the Guinea border. This is the same bauxite belt which extends on across Guinea into Guinea-Bissau and provides Guinea with the largest high-grade bauxite reserves in the world - over 3.5 billion tons. The recently completed Boké, Guinea mining project alone will export nine million tons per year of 60% alumina content bauxite to supply new refineries, smelters and rolling mills in North America and Europe with a total capital value of some $6 billion.

Alusuisse has been exporting bauxite from Sierra Leone for over 10 years with exports currently at 700,000 tons/year of 56% bauxite. They have reportedly drilled and proven over 100 million tons adjacent to the Pepel-to-Marampa iron ore railway; indicated reserves are a multiple of the proven reserves. It is proposed to establish a first-stage 600,000 ton per year alumina refinery at Pepel utilizing the existing railway, and other infrastructure of the defunct Delco iron ore mines. Total estimated cost including infrastructure is estimated at $400 million, and the annual value of alumina exports, at $165 per ton, is $100 million. Arab countries requiring alumina for their new smelter projects may join together with the Sierra Leone Government and Alusuisse, or other aluminum manufacturers, to joint venture sponsor the project.

The alumina project's sharing of the existing railway, port and electric generation infrastructure costs at Pepel will provide a new economic attractiveness to the rehabilitation of the defunct Delco iron ore project. Rehabilitation requires construction of a 4-million-ton-per-year iron ore pelletizing facility at Pepel to exploit both the Marampa iron ores and the challenging Tonkolili deposits 100 miles to the Northeast.

The alumina project is also described in more detail in Section VIII.

The following two sections describe existing manufacturing industry in Liberia and Sierra Leone.

SECTION V

EXISTING MANUFACTURING INDUSTRY IN LIBERIA AND SIERRA LEONE AND PROMOTIONAL EFFORTS

The Liberian manufacturing sector is weak with 1972 total output, estimated at $28 million, contributing less than 6 per cent of the Gross National Product, among the lower proportions in Africa. The manufacturing sector is so small that it consists of a few plants rather than industries and two-thirds of the output is produced by one firm, the oil refinery. Tavle V-1 presents Liberian manufacturing output by industry in 1971.

Decline of Liberian Manufacturing Since 1971

Manufacturing declined absolutely beginning in 1971 and there has been little real growth of new industries or product lines for the domestic market since then. Employment in manufacturing stood at 1,940 in 1969; it rose to 2,190 in 1970 and declined to 1,970 in 1972 and 1,900 in 1973. A new statistical series was initiated in 1974 showing a higher level of employment resulting from the inclusion of more smaller firms, mostly garment makers. The cigarette industry was virtually shut down in 1974; this followed a 90% cutback of the gin and rum distillery in 1971. The cutbacks were not initiated over a concern for health, as imports rose to replace the lost domestic production.

Ownership and Management of Liberian Industry

The few large firms, all managed by expatriates, which dominate production include the Liberia Refinery, the Liberian Industrial Development Company, Mesurado, Monrovia Breweries Incorporated, Liberia Industrial Production Company, U. S. T. C. Bottling Plant, and West African Shoes and Rubber.

Only a small proportion of the manufacturing establishments in the country is owned by the Liberians (see Table V-2). In 1971, for example, only five establishments out of a total of 24 were 100 per cent owned by Liberians; expatriates controlled the remaining 19 with 6 establishments owned wholly by non-Liberians. Mesurado, one of the largest of the Liberian owned firms, is managed by expatriates, including six senior British executives, and its deep sea fishing fleet of 13 vessels is entirely manned by some 200 expatriates.

The requirement for high cost expatriate management in Liberia manufacturing is one of the largest factors contributing to the sector's economic disability. The same situation exists in Sierra Leone.

TABLE V-1

GROSS OUTPUT OF LIBERIAN MANUFACTURING INDUSTRIES, 1971

Commodity	Output US$ (000)
Consumer Goods	
Bread	539
Footwear	604
Ice Blocks	90
Scarves	251
Umbrellas	126
Gin and Rum	238
Beer	1,902
Soft Drinks	1,744
Laundry Soap	329
Clothing	84
Drapery	147
Plastic Wares	178
Furniture and Upholstery	869
Total Consumer Goods	7,101
Intermediate Goods	
Petroleum Products	20,216
Paint	422
Tiles	101
Nails	138
Hydromax	1,429
Amex (AN/FO)	625
Shot Shells	346
Cement and Cement Blocks	1,964
Concrete Pipes	3
Total Intermediate Goods	25,244
Total Manufacturing Output	32,345

Source: Quarterly Statistical Bulletin of Liberia, May 1971

TABLE V-2

OWNERSHIP OF LIBERIAN MANUFACTURING ESTABLISHMENTS, 1971[a/]

Establishments	Percentage of Ownership	
	Foreign, %	Liberian, %
Bakery		
1. Heins & Maria	99	1
2. Italian Bakery	99	1
3. Monrovia Bakery Production	99	1
Furniture		
4. Giraudi Metal Industry Inc.	99	1
5. Liberian Metal Company Inc.	90	10
6. Monrovia Industrial Company	90	10
7. Liberian Industrial Production Company	92	8
8. Monrovia Construction Company	92	8
Breweries		
9. Liberian Industrial Development Company	0	100
10. Edgar Mitchell & Sons	0	100
11. Monrovia Breweries Inc.	60	40
12. U. S. T. C. Bottling Plant	100	0
13. Canada Dry (Liberia Ltd.)	100	0
Others		
14. Liberia Refinery	85	15
15. Parker Industries Inc.	0	100
16. Liberian Cement Factory	60	40
17. West African Shoes Factory	85	15
18. Liberian Cold Stores	0	100
19. Bharwancy Inc.	100	0
20. Metalloplastica	100	0
21. C. F. Jantsen Ltd.	100	0
22. Providence Concrete W/C	0	100
23. Liberian Garment Factory	100	0
24. West Africa Explosives and Chemicals	N. A.	
25. Elephant Blue Soap	90	10
26. Mesurado	0	100

[a/] Establishments employing 20 or more persons.

Source: Quarterly Statistical Bulletin of Liberia, May 1971

Sources of Financing

The Liberian Bank for Industrial Development and Investment (LBIDI) has been the major domestic source of long-term loan finance for the manufacturing sector, supplying about $1.5 million annually since 1967. LBIDI funded 30 per cent of all financing, another 50 per cent was arranged by the promoters, 12 per cent by suppliers' credits, and less than 2 per cent by commercial banks.

Although the principal objective of establishing the Liberian Development Corporation (LDC) was to assist other government agencies in promoting industrial development, the 1973 IBRD Mission reported that it had failed to do so because of:

(a) shortage of capital funds with which to promote and maintain viable industrial establishments;

(b) lack of funds to hire expert personnel and pay them competitive salaries;

(c) wrong signals by Government, leading to poor investment choices.

The result was that in 1973 the LDC held Government equity investments in only three enterprises, West African Shoe and Rubber Industries, Liberian Iron Ore Limited, and LBIDI: in addition, a $50,000 investment in the handicraft industry was under consideration. Recently, the LDC initiated a controversial agro-industrial estate program described in the food processing industry section of this report.

Liberia has attempted to create an industrial park in Monrovia under LDC Management, but after four years, no roads, utilities or grading have been completed. Only the oil refinery is located there occupying the prime site on high land adjacent to the main road. Other potential entrepreneurs have located elsewhere.

Sierra Leone and Liberia are not alone in experiencing difficulties in obtaining adequate financing for industrial development projects. Most developing countries experience similar difficulties, albeit in different degrees. Development finance for industry in developing countries originates principally from three sources, private foreign capital, local capital (government or private sources) and international lending agencies including public assistance from foreign governments. The fact that adequate financing has not been forthcoming for industrial projects in Liberia and Sierra Leone arises from a number of reasons, the most significant being the high nature of the risk involved. The reasons for such scarcity of capital will be examined in more detail in the following paragraphs and some suggestions for improving the situation will be considered.

Before foreign private capital willingly enters a developing country, a number of conditions must exist. Foremost among these is political stability, followed (not necessarily in order) by provisions for the necessary infrastructure such as roads, ports, power etc., so that industry can operate; natural resources; economic and

fiscal viability; adequate markets for industry products and favorable investment incentives. Foreign private entrepreneurs also do not like to risk capital in high cost uneconomic domestic manufacturing industry viable only with government protection. While these are not all the factors that are considered by foreign investors, they represent the major areas to be examined before investment will be realistically undertaken. Of these investment factors, Liberia and Sierra Leone claim political stability and limited natural resources. Liberia's investment incentives program has been considered more generous than Sierra Leone's where exchange restrictions have further discouraged capital flows.

For a variety of reasons, domestic government financial sources in both countries are limited. Private local financing for local entrepreneurs through the banking system has not been forthcoming because the risk of these ventures is formidable (due to the product's poor marketability, the entrepreneur's lack of technical knowledge or insufficient credit worthiness).[1] As for local capital markets, it is generally not feasible to establish these on a national basis in most African countries because of the small size of the economies and the low incomes and savings.[2]

International lending (World Bank, United Nations, African Development Bank, foreign governments) has in general been directed in Liberia toward programs in agriculture, education, health, public administration, transportation, communications and power rather than to industrial projects. In Liberia from all sources such lending has averaged only around $20 million per year since 1969. On the other hand total foreign debt servicing for Liberia during the same period averaged 21 million per year so that the net transfer of public foreign assistance was in fact actually negative.[3] In spite of a trade surplus in 1974, the external debt servicing coupled with other factor payment abroad and the high cost of imports created a deficit in the Liberian Balance of Payments. In Sierra Leone a serious budgetary and Balance of Payments crisis has existed since 1973 and worsened in 1975 with declining export earnings. Unless the Balance of Payments situation in both countries improves, foreign assistance cannot be expected to provide the needed capital infusions.

Obviously, improvement in the investment climate for foreign private capital can only come from improvements in the economics and politics of the society itself. The creation of the Mano River Union between Sierra Leone and Liberia is a step in the right direction, because it can increase not only the markets for industry's products but also help to create the needed infrastructure for industry's development. A case in point is the bridge across the Mano River which has just been completed and as a

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[1] Financial Intermediation, Savings and Mobilization and Entrepreneurial Development - The African Experience, R. J. Bhatia and D. R. Khatkate, International Monetary Fund Staff Reports, March 1975.

[2] Development of Capital Markets in Africa, Edward A. Arowle, International Monetary Fund Staff Reports, July 1971.

[3] Economic Survey of Liberia, 1974 Ministry of Planning and Economic Affairs, Liberia.

result shortly there will be economic road transportation between Freetown and Monrovia.

On the domestic level, credit guarantee schemes which insure banks against possible losses are one method by which the supply of local credit can be increased. Money for such guarantees can be drawn from the Central Bank on the government budget. Credit guarantee plans have been instituted in Ghana, Ivory Coast, Senegal, Togo, Upper Volta and even in Sierra Leone.

On another level, banks could be induced to provide technical services to borrowers. Ghana has a development financing unit attached to the Ghana Commercial Bank, while the Ivory Coast, Togo, Upper Volta and Niger have business advice centers which supervise entrepreneurial activities and give advice on finance, accounting and technical aspects of business. Although the situation as regards the amount of financial intermediation has not changed perceptibly, these business and technical services appear to have helped the situation and credit has been increasing to industry in these countries. [1]

While it is probably not feasible to establish capital markets on a national basis in Sierra Leone and Liberia, a regional capital market serving two countries or many countries could facilitate mobilization of savings and encourage the holding of wealth in the form of financial assets. It requires an absence of restrictions on capital movements and on dividends and profits within the group of countries setting up the market. Countries with common monetary arrangements such as the West African Monetary Union provide a framework to launch regional capital markets and conceivably such an arrangement might in time be developed by the Mano River Union.

International lending agencies could be prime sources for infrastructure capital especially when infrastructure is required by an economic industrial project and such costs can be disassembled from the main financing of the project, and paid for by rents, fees and tariffs in foreign exchange accrued from the operation of the project. This would make it easier to repay long term international loans without adding burdens to a country's balance of payments or foreign borrowing capability. This possibility is discussed for the proposed export industries in Section VIII.

Exports of Manufacturers

Only one Liberian manufacturing industry has been capable of competing in the export market. West African Explosives and Chemicals exported $4.3 million of explosives in 1974, mostly to Mauretania. This industry was established to serve Liberia's large iron ore mining industry and had to be competitive. The new $30 million export plywood firm, Vanply, will also be internationally competitive. These are the two exceptions in Liberia's industry.

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[1] Financial Intermediation, Savings and Mobilization and Entrepreneurial Development - The African Experience, R. J. Bhatia and D. R. Khatkate, International Monetary Fund Staff Reports, March 1975.

The Liberian Investment Incentive Code lacked incentives for exporters. Export markets are clearly more competitive than the protected domestic markets. Unless export products are entitled to drawbacks of taxes on raw material inputs into exported goods, the firms cannot export.

Provision for drawbacks in Sierra Leone have never been realized by the domestic manufacturers even though the more sophisticated manufacturers there could benefit from it.

The arranging of a highly protected home market, to realize high profits, has prevented the development of exports by the firms producing such products as cement, furniture and soap. In fact the high cost of production of most of these firms makes them uncompetitive in the world market. With the single exception of explosives all of Liberia's manufacturing plants were producing (or packaging) for the home market only, taking advantage of high protection.

Government Promotion of Manufacturing Investment

As mentioned in a previous section, the investment climate of Liberia lacks the conditions important to potential investors, namely: large internal market and/or a high per capital income, a developed infrastructure and skilled manpower. The Government has, nevertheless, focused on foreign and domestic private investment as the crucial element to industrial development. It therefore welcomes foreign private investment, and attempts to stimulate investment through very liberal investment incentives. However, investment incentives have not been enough to stimulate industrial development in Liberia's situation. Virtually no private capital has come into the Liberian consumer goods manufacturing section since 1971. The same is true of Sierra Leone.

The combination of tariffs on finished products and import duty exception on inputs has been used to establish import replacement industry without consideration of the economic costs of such a policy, and without recognition of the inherent conflict between the rising domestic prices which inefficient import substitution inevitably brings, and the country's potential for the export of manufactured goods. Table V-3 presents the pattern of import substitution in Liberia. Table V-4 presents Liberia's effective tariffs on imported manufactures. Annex Table 3 presents the tariff rates in both countries by commodity group.

Availability of a large internal market is an essential factor for a successful import substitution policy that would lead to an efficient use of economic resources. Unfortunately, Liberia has not got this large internal market, and the proposed Union markets of Liberia and Sierra Leone and even the Ivory Coast would not change the situation significantly for most products.

TABLE V-3

THE PATTERN OF IMPORT SUBSTITUTION IN LIBERIA 1970
($000)

Commodity	Gross Value of Domestic Output	Imports (c. i. f.)	Duty Paid on Imports	Imports, Including Duty	Value of Total Domestic Supply	Imported Intermediate Input	Proportion of Imports
Consumer Goods							
Beer	1,952	591	957	1,548	3,500	86	.44
Soft Drinks	706	-	-	-	706	20	-
Grain Milling Products (Bread)	370	748	224	972	1,342	n. a.	.72
Alcoholic Beverages (Gin & Rum)	2,486	1,455	1,055	2,510	4,995	154	.50
Wearing Apparel	221	3,589	1,003	4,592	4,813	n. a.	.95
Leather Footwear	11	199	43	242	253	n. a.	.96
Soap and Cosmetics	237	1,367	378	1,745	1,982	322	.88
Plastic Products	441	540	53	593	1,034	n. a.	.57
Wood and Furniture	802	797	173	970	1,745	467	.55
Intermediate Goods							
Paints and Varnishes	378	805	41	846	1,224	76	.69
Fertilizers and Pesticides	358	519	0.5	520	878	7	.69
Petroleum Products	12,184	3,943	130	4,073	16,257	8,721	.25
Tires, Tube & Rubber Products	140	3,430	201	3,631	3,771	n. a.	.96
Capital Goods							
Cement and Lime	2,042	379	5	384	2,425	n. a.	.16

Source: IBRD Economic Survey of Liberia, 1974

TABLE V-4

LIBERIAN EFFECTIVE TARIFFS ON MANUFACTURED GOODS, 1971

Commodity	Imports (cif) ($000)	Tariffs ($000)	Effective Tariff Rate (%)
Beer	641	949	148.0
Grain milling products (bakeries)	4,083	206	5.0
Dairy products	1,506	203	13.5
Sugar and Confectionary	1,561	475	30.4
Alcoholic beverages	1,947	1,420	72.9
Non-alcoholic beverages	224	52	23.2
Tobacco	2,562	2,781	108.5
Wearing apparel	4,587	1,449	31.6
Leather footwear	468	130	27.7
Wood and Furniture	620	178	28.7
Paints and Varnishes	n.a.	n.a.	n.a.
Soaps and Cosmetics	1,528	519	34.0
Plastic Products	482	55	11.4
Animal/Vegetable Oils & Fats	665	78	11.7
Animal Feeding	352	9	2.6
Petroleum products	2,035	83	4.0
Tyres, tubes and rubber products	677	245	36.2
Cement and lime	1,228	4	0.3
Transport Equipment	4,644	1,004	21.6
Cutlery, tools and hardware	2,628	44	1.7
Total	32,438	9,884	30.5

Source: IBRD Economic Survey of Liberia, 1974

The Investment Incentives Code

The Investment Incentives Code of the Republic of Liberia which was approved by the Senate and House of Representatives in 1966 provided various incentives to encourage private capital investment in Liberia. The incentives include (1) income tax exemption and relief for varying periods of years, (2) import duty exemption on both capital and raw material goods, and (3) remittance of profits and capital guarantee. Additional benefits include (4) provision of facilities for lease of land and for securing loans and equity capital.

Import Duty Exemptions and Excise Taxes

Excise taxes are paid in lieu of import duties by some of those firms which have been granted import duties exemptions under the Investment Incentives Code, however, the rates are not as high as the import duties. The Liberian Government, unlike the Sierra Leone Government, has sufficient income from its profitable export industry that it does not have to rely as heavily on import duties for its tax base.

The excise tax rates also lack uniformity; some products are exempted from excise tax, other products such as batteries pay rates as high as 27 percent. Some firms are granted a tax holiday of up to 5 years before beginning to pay excise tax, while other firms pay excise taxes as soon as they go into production. The levels of effective protection are, of course, influenced by such taxes and the Investment Incentives Code is thus discriminatory.

Quantitative Import Restrictions

The importation of some products in Liberia, such as cement (except white cement), car batteries, matches, detergents, and petroleum products is banned completely, thus giving infinitely high protection to domestic producers. As these producers are all monopolists by the nature of the market, they are able to operate profitably, charging high prices. There is no effective price control. In Sierra Leone all imports are licensed, allowing elements of monopoly. Domestic manufacturers, such as the Brewery are, however, subject to price control.

Income Tax Exemptions

The Code provided exemptions from taxes on income derived from an approved new investment project for a period of five years from the first year of marketable production. For projects involving substantial investments, with prospects of large direct benefits to the Liberian economy, exemption could be granted for a period of up to 10 years. The IBRD mission noted that the income tax exemptions provided by the Liberian Code appear to have been unnecessarily generous.

Foreign Exchange Policy

The Liberian "open door policy" provides freedom of capital movement, including repatriation of dividends, profits and capital. There is a complete absence of

exchange controls. The IBRD Mission in 1973 observed that although the "open door policy" has assisted the creation of a favorable investment climate, it also has negative aspects, especially when combined with tax holidays. First, it reduces the incentives of both local and foreign investors to re-invest in Liberia, particularly if there are more profitable opportunities outside the country. Second, it facilitates income tax evasion.

In Sierra Leone, exchange control has limited repatriation of profits, especially by the major firms, forcing them to look for domestic investment outlets. However, most commercial profits easily bypass exchange controls.

Creation of Monopolies

The Code also dealt with firms rather than on an industry group basis. High effective protection granted to firms has led to the establishment of highly profitable monopolies leading to high prices and relatively high labor costs.

Providing Incentives for Small Enterprises

Liberia has a small domestic market and hence small enterprises are in a better position to develop as import substitute industries than medium and large enterprises. This view is supported by the results of the inquiries made into the output capacity of the fifteen firms interviewed by the 1973 IBRD Mission. Only four of these firms were working at full capacity in 1971, while the rest worked from 7 per cent to 73 per cent of total capacity. The situation of the matches and bleach firms was the most serious, producing only 15 percent and 7 percent of total capacity respectively. In the matches factory one machine, on the average, was lying idle daily owing to lack of sufficient demand. In such situations smaller enterprises would be more efficient and more profitable socially than large enterprises if management costs were reasonable.

In Sierra Leone a second small one-machine candle factory is to be established by B. P. with less than $50,000 capital, to handle a third of the internal market. A similar Liberian candle factory was announced, but with a capital of $570,000.

The second reason is based on the entrepreneurship argument. There are as yet very few Liberian entrepreneurs who are able to manage, financially and technically, medium and larger scale industries in Liberia. As noted above nearly all existing industries are managed by foreigners who generally also were instrumental in initiating them. Even in the small-scale commercial sector the overwhelming majority of the proprietors are Lebanese and other non-Liberians.

Level of Protection in Liberia's Manufacturing Sector

The extent of import substitution for the different manufacturing industries is indicated in Annex Table 3, which shows the sales of imported goods as a proportion of the total domestic supply. Grain milling products, wearing apparel, leather footwear, soap and cosmetics and tires and tubes are products where scope for import substitution still exists, if the market were large enough for economic production. Petroleum

products, cement, beer, paints and varnishes, plastic products, wood and furniture firms also achieved virtually 100% import substitution by 1973. (The exceptions are the cigarettes and gin and rum industries which were almost shut down). The only future growth in these industries must arise from the modest growth in domestic demand.

Although import substitution has reached an advanced state in some industrial products, the efficiency of the import substitution also has to be examined. Not only is the total industrial value created by these import replacing activities small in absolute terms, but it is even smaller in relation to the expected growth of the industrial sector. Scale economies, especially for plants with high expatriate staff costs, are an important determinant of unit costs. Liberian or Sierra Leonean, or combined market for most consumer, intermediate and capital goods is too small (and will continue to be so for many years) to justify plants of a minimum efficient scale of output.

There is considerable variability in rates of nominal and effective protection for individual firms. The rates of nominal protection range from 11 per cent for animal feed to 50 per cent for toffees (see Annex Table 3); the rates of effective protection are much higher, as high as 818 per cent for shoes. The variability of protection among the Liberian firms reflects the highly discriminatory nature of granting incentives to applicants under the Code, as well as the degree of inefficiency of the firms. High variability in rates of effective protection for individual firms has also reflected the absence of a systematic government policy of protection, as well as lack of adequate consideration of the cost of protection to the national economy.

High rates of effective protection (above 60%) were extended to three consumer goods firms, beer, shoes and furniture, and to three intermediate goods firms, paint, petroleum and nails. Biscuits and toffees have infinite effective rates because they have negative values added when their inputs and outputs are valued at international prices. Only seven firms, soft drinks, soap, animal feed and matches in the consumer goods sector, and three bleach, cement and tiles in the intermediate goods sector seem to have effective rates of protection less than 60 per cent. As Liberia paid more for its clinker cement imports in 1974 than Sierra Leone paid for sacked cement, the cement industry would also appear to have had a negative value added in 1974.

Relating Protection to Efficiency

(1) Value Added Criteria

For policy-making purposes, it is desirable to know whether the high protection afforded the Liberian firms has been employed to increase domestic value added or profits; i.e., to create efficient industries making high profits, or inefficient industries making low profits.

Only four firms, beer, matches, bleach and tiles had a value added to output ratio above 50%. With the exception of beer, these firms also belong to the category of less highly protected industries, with effective protection less than 60 per cent. Furthermore, those firms with the highest rates of effective protection, shoes, petroleum and nails, have the lowest ratios of value added to output. The lowest ratio of domestic value added, less than 5%, belong to the biscuits and toffees firms, whose rate of effective protection is infinity. Thus, in the Liberian manufacturing sector, we can associate industries with low rates of effective protection with high value added, and industries with high rates of protection with low value added.

The biscuits and toffees firm represents a special case. The value added to output rate of 5% is far too low to justify the rate of protection afforded the industry. Compare the nominal rate of protection of 39% given to the biscuit and toffee industry with the value added ratio of only 5%. This implies that it is costing the community $39 out of every $100 spent on imports of these products to protect the industry which adds only $5 in return. Value added by the firm does not justify the heavy protection being given to it. In other words, it is being overprotected and the same argument applies to detergents, nails, petroleum, soap and shoes.

(2) Domestic Resource Cost Criteria

Another criterion that the 1973 IBRD industrial survey mission used to assess whether protection was being used to raise social profits or to support inefficiency was Domestic Resource Cost (DRC). This is a measure comparing the level of efficiency with the level of protection given. The DRC indicates the opportunity cost (in terms of domestic resources) of earning or saving a unit of foreign exchange; or the minimum value of domestic factors that are necessary to save or earn one unit of foreign exchange. If the value of the domestic factors required to produce a product is less than the net foreign exchange saving brought about by domestic production of the product, then the process is considered socially profitable, provided that all the domestic factors and the foreign exchange are valued at their opportunity cost.

The IBRD found in 1973 that the DRC of eight firms was negative implying that the economy was paying more units of domestic resources (ranging from $1.00 in the case of beer to $4.60 in the case of furniture) to save one unit of foreign exchange. This indicates that the firms are not only inefficient, but also socially unprofitable. The value of their tradable inputs and foreign factors at international prices exceeded the international value of the goods they produced. This implies a waste of foreign exchange. We can now add detergents to the list.

The eight firms, beer, shoes, petroleum, tiles, biscuits, toffees, nails and furniture, with negative DRCs also were firms where most of the factor inputs - skilled labor, entrepreneurship, and capital were non-Liberian. The result is that the total foreign factor cost exceeded the value added at international prices. The protection given to these firms has resulted in a waste of foreign exchange and thus their situation is inferior to that with a positive net foreign exchange savings no matter the amount of domestic factors necessary to obtain the savings.

Comparison with Sierra Leone Manufacturing Firms

Sierra Leone developed virtually the same import substitution industries as Liberia somewhat earlier in the 1960's. The industries are also owned and managed by expatriates, but are generally larger and more economic. Where Liberia has failed to develop a competent cigarette industry, the modern plant in Sierra Leone handles the entire market. The same is true for the distillery industry. The industries in Sierra Leone have also benefited from the early construction of a proper industrial estate at Wellington, outside Freetown.

However, like Liberia, virtually no constructive investment in domestic manufacturing has come into the country since 1970. The few projects initiated since then have been promoted as overcapitalized investments by equipment suppliers, or management consultants, undertaking no risk themselves and taking out their profits on the front end. The Government's program to attract foreign capital investment in domestic, or export industry lacks competent technical administrative direction. The Unido Advisor to the Ministry of Planning has recommended formation of a National Industrial Development Corporation to overcome this disability.

The experience of existing firms, subjected to price control and exchange control, does little to encourage new investment. However, discrimination against the few Lebanese industrial investors is not as evident as in Liberia.

Harmonization of Investment Codes

Harmonization of the investment incentive programs of Liberia and Sierra Leone, now being planned by the Mano River Union Ministerial Council, is considered an important condition of economic union between the two countries. The necessary conditions for the promotion of regional enterprises serving a regional market is the adoption of legislation by each country that assures uniform treatment of both tax incentives and other factors governing investment. The objective of such harmonization should be not only to attract new businesses and expand existing ones, but also to prevent harmful competition between member states in attracting foreign investors.

While formulation of specific legislation has not as yet been accomplished, studies have been undertaken by the Secretariat of the Mano River Union on the number and kinds of investment incentives to be enacted and agreement in principle on several of these codes has been reached between the two countries. The investment incentives which may likely be recommended for harmonization at some future date are described below:

1) A common external tariff structure (for revenue) against imports from outside the common market that provides a reasonable level of effective protection for import substituting industries.

2) Removal of barriers to inter-country trade in goods of national origin so as to promote freedom of trade between the member countries.

3) A limited exemption of duties on capital goods, raw materials and intermediate goods not produced in Liberia and Sierra Leone to be used for import substitution industries.

4) Continuing exemption of duties on capital goods, raw materials and intermediate goods not produced in Liberia and Sierra Leone used for export industries by means of a 100% drawback on duties paid on imports that are used to manufacture export goods.

5) Basing Union industries on the utilization of local materials, supplies and labor and avoiding those based on a high import content. A requirement that a Union industry produce a value added of at least 15%.

6) Harmonization of income tax systems relative to corporate earnings and dividends (the company tax rates in Liberia are substantially below rates in Sierra Leone).

7) Limited tax holidays for import substituting industries.

8) Uniform excise taxes on domestically produced consumer goods.

The final legislation enacting such investment codes may take the form of a harmonization of the national codes; or an identical but separate investment code may be enacted with regard to Union industries only, leaving the existing national investment codes untouched. Whatever form harmonization may eventually take, it appears that some progress is being made on this important matter.

Third Country Participation in the Mano River Union

While the Mano River Union is planning a close integration between the economies of Sierra Leone and Liberia, there may be possibilities for an association with third countries through which the Union may become even stronger. This additional association may not be as all inclusive as that between the two Union countries, but confine itself to agreements for specific purposes. Two of the countries which would likely become partners in any third country participation are the Ivory Coast and Guinea since these two countries have common borders with Sierra Leone or Liberia. However, other countries of West Africa might accommodate themselves to such an association.

A very much talked about device for economic integration is a Regional Development Bank. An arrangement such as this might be considered with the Ivory Coast in which Liberia, Sierra Leone, and the Ivory Coast are donors to a regional bank for industrial development. Initially, Liberia and Sierra Leone would benefit from the contributions from the Ivory Coast although in the long run all countries would share in the increased financing that would be made available. Guinea might be brought into the scheme as her treasury is being augmented by increased revenues from bauxite and alumina export taxes.

Similar to a Regional Development Bank are programs such as Mutual Aid and Guarantee Funds. This concept was implemented in West Africa in 1966 and was a continuation of the Solidarity Fund whereby the Ivory Coast subsidized the budgets of three of its poorer neighbors. Under the Mutual Aid and Guarantee Fund, the Ivory Coast was the principal source of finance but contributions were made by the Upper Volta, Niger, Dahomey and Togo. The institution of this scheme reflected the enhanced importance attached in the Ivory Coast to helping its neighbors get a larger share of economic development and marks one of the several signs of a new spirit of collaboration in the area. However, all of these countries are members of the Francophone bloc, and it might be questioned as to whether French Aid (Ivory Coast budgets are subsidized by France) would be used in other countries. The concept might also be applied in an association with Ghana and other English speaking countries.

Bilaterial arrangements with Guinea or the Ivory Coast are other means whereby these countries could participate in a limited integration with the Mano River Union. Mutual reductions of customs duties on certain exports to each area would be a useful instrument to expand markets for both the Union and these third countries.

Another area of third country participation is the partial integration of an industry in a third country with the industry in the Mano River Union. Cooperation in the development of the alumina industries in Guinea and Sierra Leone might be a possibility. Another possibility is to cooperate with Guinea in the construction of a large economic size cement plant at the proven large limestone deposit located at Siguiri on the Niger River including the extension of the railway into Liberia at Nimba. A more likely possibility is for a joint - venture with Senegal on an economic additional kiln expansion at the Senegal cement plant to supply clinker to the Monrovia and Freetown clinker grinding plants. The plans might include allocation of market shares, joint services such as shipping and a jointly owned public corporation. See the Cement Industry discussion in Section IX.

Various other institutional arrangements could be implemented for cooperation on a functional basis such as joint ownership of Liberia's port facilities and railway at Buchanan with Guinea to allow export of Guinea's iron ore from Mt. Nimba.

International River Basin Commissions invite third country participation in the development of economic hydroelectric resources to the benefit of all concerned. Economic possibilities exist today for Liberia to join with Guinea in developing the required upstream hydroelectric dam on the St. Paul River and with the Ivory Coast to develop the 300 MW Teboto dam site on their bordering Cavelly River, in both cases integrating all four nations' electric transmission grid systems.

The next section discusses and compares the few existing manufacturing firms in the two countries, and includes observations on possible Union marketing opportunities.

SECTION VI

UNION MARKETING POTENTIAL OF EXISTING SIERRA LEONE AND LIBERIA MANUFACTURING INDUSTRY

A number of the existing small industries in Sierra Leone and Liberia may benefit from the integration of the two countries. The following industries were thought to have export potential and were investigated to ascertain if they could benefit from a Mano River Customs Union: beer, cigarettes, liquors, confectionaries, knitwear, suitcases, cosmetics, paints, nails, terrazzo tiles, car batteries and plastics. As these are industries already existing in both countries, or at least in one, there is no need for outside feasibility studies. What is intended in the following paragraphs is to briefly discuss the present status of each of these industries, the market for their products and whether or not there is a possibility for exports into the other country.

The existing firms are monopolists and are generally highly protected. They also are producing at only a fraction of their productive capacity, partly due to the small size of the market and relatively low purchasing power of the consumers. Some of the companies also overassessed the amount of machinery needed for the small size markets. Expatriates manage nearly all of these firms. They also control the importation and distribution of the products. Production in these firms is almost entirely based on imported raw materials and the domestic value added content is low, in most cases limited to wages, water and electricity used for production. If the volume of trade and production could be increased, it may serve as an incentive for the increased domestic production of some raw materials such as tobacco, sugar, alcohol, maize and bottles.

Beer

Sierra Leone Breweries, owned principally by Heinekens, Guinness, Unilever, and other foreign firms, produces a good quality local brand beer, "Star", and also makes "Heinekens" beer and "Guinness" Stout under licenses from the parent companies in Holland and the United Kingdom. Production currently is 90% of capacity or about 31.2 million bottles of beer. This company has about 94% of the market in Sierra Leone. As Sierra Leone Breweries would very much like to enter the Liberian Market, extension of capacity by 25% is planned and should be available for production in 1977. The growth of beer consumption in Sierra Leone has averaged 10% annually. Currently local beer in Sierra Leone sells at Le0.32 to Le0.40 a bottle, retail. Imported beer sells at Le0.60 a bottle.

Liberia has a local Brewery, Monrovia Breweries Inc. which produces a local "Club" brand, a quality beer and "Guinness" stout under a license agreement. Monrovia Breweries produces at about three-quarters of the level of its Sierra Leone counterpart and takes about 70% of the Liberian market. The remainder, some 3 million bottles in 1974, is imported. No increase in capacity is planned by this brewery.

Importers in Liberia feel that Sierra Leone Breweries "Heinekens" beer will be of special interest because the Dutch beer is already the leading imported beer in the Liberian market. The Sierra Leone Brewery could market the "Heinekens" brand in Liberia, after building its own storage facilities in Monrovia. The new road between Monrovia and Freetown must first be completed, as the existing road cannot be used for bottle transportation.

Tobacco

Aureol Tobacco Company of Sierra Leone produces about 1.2 billion cigarettes a year in several brands. The "Western" sells at Le0.16 a pack, the "555" at Le0.42 a pack and the "Tabaca" at Le0.14 a pack. The company also sells a Hollywood, Paxton and Menthol brand. The American made "Lucky Strike", the main import, sells at Le0.50 which includes a 48% import duty. Aureol Tobacco imports leaf tobacco from the U.S. A. and Canada, but is encouraging the domestic growing of leaf tobacco which should lead to self-sufficiency by 1977.

Aureol Tobacco Company has about 90% of the domestic market in Sierra Leone, and is planning a 30% increase in capacity. Demand in Sierra Leone is increasing by about 2.5% annually, a rather low rate. By 1980 demand is projected at about 1.4 billion cigarettes, still well below plant capacity.

The Monrovia Tobacco Company in Liberia has virtually closed down due to high discriminatory customs duty on tobacco and high excise taxes. It has been compelled to lower its price on its one remaining brand in order to compete with imports, resulting in losses. In 1974 prior to the levying of excise taxes, this company had about 30% of the Liberian market with the remainder being taken up by imports, mainly U.S. brands. There are no cheap popular brands in Liberia comparable to the Sierra Leonean "Western" and "Tabacca" brands due to the high excise tax system. Consumers who are unable to afford cigarettes are using cut tobacco to roll cigarettes. It would be possible for the cheaper Sierra Leone brands to take a substantial share of this market provided tax preferences are granted which haven't been granted to the Monrovia Tobacco Company, and investments made in advertising. Importers in Liberia point out that Liberians are brand minded, preferring U.S. brands and the importers do not want to bear the expense of advertising Sierra Leone cigarettes. Aureol Tobacco Company, if it enters the Liberian market, would market initially in the outlying areas with point of sale advertising, working its way toward Monrovia.

Liquors

Wellington Distilleries of Sierra Leone, partially owned by the Government, produces a fairly good quality gin, whisky and rum. Alcohol and gin-whisky-rum concentrates are imported to produce around 10,000 cases of liquor annually, about 40% of capacity. Partly reflecting the small protection afforded this company (its brands sell on the average one-third, or Le2.00 cheaper than imported brands) it has only 15% of the market for gins and 50% of the market for rum. Demand is growing at about 5% annually.

The distillery has been using only imported alcohol for its gin and rum lines because the Marketing Board, which used to buy "Omole" palm wine from farmers, and resell it to the distillery for processing into alchohol, abandoned its program for unexplained reasons. The present management of the distillery is interested in distilling alcohol from locally grown sugar. Their present "Omole" distilling equipment is unutilized.

In Liberia Mitchel and Sons Distilleries with modern equipment is working at about 1/10 of its potential capacity. Due to the high costs of raw materials, and inadequate protection, it cannot compete with the prestigious imported brands in spite of the fairly good quality of its product. In Liberia only the poorer customers buy the cheaper local made brands; the middle and upper classes buy British gin.

Both distilleries are having problems with imports of bottles as well as recovery of used bottles. Wellington Distilleries is experimenting with a polyethylene totepack (contains 1-1/2-2 ounces of liquor) and if it could finance installation of the packaging machinery, it could significantly lower bottle and transportation costs. Some joint cooperation within the Mano River Union context might be arranged for the financing and supply of "tote-packs" to each distillery.

Because both distilleries are operating well below the demand potential of their markets, there appears to be little possibility for each to penetrate the other's market.

Confectionary

Natco (National Confectionary Company) of Sierra Leone is partly owned by Choitrams who is the biggest Natco shareholder and sole importer and distributor of Natco biscuits. This company has a monopoly in Sierra Leone, with imports of biscuits and confectionary prohibited. Natco imports all of its sugar, glucose, and cellophane for packaging. Natco markets its biscuits in Liberia, selling CIF in Monrovia at $0.50/box. Competitive imported biscuits sell at $0.45/box in Liberia resulting in the Sierra Leone Company taking about 10-20% of that market. The import of confectionary is impossible due to local production protected by a 50% duty.

Market growth in Sierra Leone is decreasing with over-capacity of Natco's operations. The Company produces about 5 million lbs of confectionary and biscuits per year, but is capable of producing about 7.2 million lbs of these products.

Natco is currently exporting biscuits to Gambia, Nigeria and Ghana. The packaging is quite good at protecting the products against African humidity. Biscuits are produced for export at between Le0.24 and Le0.28 per box which is higher than costs of imported brands. However, Natco biscuits do have a freight advantage over their competitors in nearby markets.

As distribution channels are already established, Natco biscuits would have a good opportunity in the Liberian market (assuming tariff exemptions). Their position could be made even more competitive if road transport was made easier.

Cosmetics

The A. J. Seward Division (United African Company of Sierra Leone) is a small cosmetics manufacturing establishment dealing with a wide range of cosmetics and working at full capacity. The company has been able to export small quantities to the Liberian market through Catco Ltd. in Monrovia or indirectly through retailers. Much of the latter trade enters the Liberian market unregistered. The unregistered trade represents a serious problem since the high Liberian import duty on cosmetics (70%) makes it impossible for legitimate imports to compete with smuggled goods. The possibilities of Sierra Leone cosmetics entering the Liberian market will depend on the new tariff structure and measures to be taken to limit unregistered trade.

Paints

Union trade of paints produced in either country is not considered economical or practical, since each producer is able to supply the full demand of his national market.

Suitcases

Sierra Leone Suitcase Works Ltd. presently works at about 60% of its potential capacity producing about 60-80,000 units per year, competing with suitcases imported from Europe; cheaper ones from Czechoslovakia, and Asia. There is a market for Sierra Leone suitcases in Liberia with Sierra Leone's prices being competitive with those of Czechoslovakia. Good road transportation to Monrovia and a reduction in tariffs would make Sierra Leone's products even more competitive.

Nails

The Liberian nail factory is presently working at 30% of its capacity due to lack of markets. The company had originally overassessed demand for its products and overbuilt its plant. Nails are manufactured in Sierra Leone by the Sierra Leone Nail Factory with production increasing steadily since 1968. Imports are generally brought in under license to protect local products. Ex-works prices/for nails in Liberia are $0.20/lb lower than prices in Sierra Leone, and should give Liberian nails a chance to compete in the Sierra Leone Market especially for those sizes not produced there, provided that licenses and customs reduction are granted.

Terrazzo and Marble Tiles

The Liberian Factory, Baakland and Azzi, produces terrazzo and marble tiles for floors and walls. Currently, it is utilizing only 10% of plant capacity due to lack of demand from the home market. In Sierra Leone, terrazzo tiles and marble tiles are produced by three small factories. Only a small volume of imports enters the country under license. Liberian "8 x 8" tiles are $0.30 to $0.38 cheaper than the Sierra Leone and imported tiles. The quality of the Liberian product is better and provided import licenses are granted, market penetration could be effected.

Animal Feed

Feed Mill Products (Sierra Leone) is currently producing animal feed, mainly for poultry, at 2,400 tons/year and is capable of doubling its production. It utilizes domestically grown maize (20%) as a raw material and is encouraging the further use of it. Other raw materials concentrates and fish meal are imported.

In Liberia the Mesurado Group produces about 2,300 tons/year of animal feed but imports remain quite large, mostly from Holland, because the local brand is not considered satisfactory. Sierra Leone prices are competitive with Dutch imports in all except one of the four products marketed, and therefore prospects for Sierra Leone to compete with imports in the Liberian market appear good.

Car Batteries and Plastic Ware

Potential exists for the Liberian battery manufacturing concern, working at 50% of its capacity, to enter the Sierra Leonean market where there is no domestic production of auto batteries. The competition for imported batteries in the Sierra Leone market is keen, but no assessment can be made as to the possibilities of competition with imported brands since no prices were made available by the Liberian company.

Plastic Ware

There is some possibility that Mettaloplastic Ltd. of Liberia can penetrate the Sierra Leone market to supply kitchen ware and containers if road transportation improves. However, shortages of raw materials and the resulting price rises have lessened the firms competitiveness.

Knit Wear

Sierra Leone Knitting Mills, owned by Indians, is presently operating at 50% of capacity serving about 65% of the Sierra Leone market. Raw materials, cotton and nylon, are imported from the Far East and United Kingdom. Production has decreased steadily since 1969 reportedly due to the stagnating economy which has made the people conservative in their buying habits. The market is not expected to grow in the foreseeable future and in spite of the company's lower prices, demand for knitwear remains tied to imported European and American fashions.

Sierra Leone Knitting Mills fabrics in Liberia sell at 35-40% higher than CIF imports from China and Hong Kong. Sierra Leone fabrics would not be of interest to importers in Liberia used to French and American-made products, but they would be acceptable to medium sized and small importers providing prices were lowered. The current tariff is 20% on knitted fabrics in Liberia.

It would seem possible that Sierra Leone knitwear could be introduced into the Liberian Market if the manufacturer improved his marketing and pricing and if customs duties were lowered. Moreover, cloth produced by Sierra Leone Knitting Mills could be

sold to local tailors both in Sierra Leone and Liberia who are at present buying imported cloth.

Summary

Of the industries considered above, the following appear to have good prospects for expanding their markets into either Sierra Leone or Liberia.

Beer

Cigarettes

Confectionary (Biscuits)

Cosmetics

Suitcases

Nails

Terrazzo Tiles

Animal Feed

Knitwear

The actual possibilities of marketing these products will ultimately depend on the firms' future export prices. Given their higher cost of imported raw materials and high production costs due to small scale production, the potential for competition will depend on the treatment given them in licensing, customs, tariffs, lower transport costs and streamlining the present inadequate system of import duty drawbacks.

SECTION VII

ANALYSIS OF IMPORT SUBSTITUTION INDUSTRIES RECOMMENDED FOR POSSIBLE "UNION INDUSTRY" DEVELOPMENT

The following proposed "Union" industries are analyzed in this section:

1.	Textile Printing	- Sierra Leone
2.	Synthetic Textile Weaving	- Liberia
3.	Rubber Tires	- Liberia
4.	Glass Containers	- Either Country
5.	Agricultural Implements and Hand Tools	- Sierra Leone
6.	Detergent Manufacturing	- Liberia
7.	Salt	- Sierra Leone
8.	Dry Cell Batteries	- Either Country
9.	Sardinella Fishing Industry	- Sierra Leone

TEXTILE PRINTING INDUSTRY

Economics of Industry Establishment

The largest proportion of textiles consumed in Sierra Leone and Liberia is printed cotton; so-called African or Java prints. The present consumption of this material in each country has been estimated to average 4-1/2 linear yards per capita in 1975, or some 14 million linear yards in Sierra Leone and 7 million in Liberia (a linear yard of material being defined in the trade as that cut from a bolt 46 inches wide).

Attached table VII-1 presents the textile imports. The African prints are imported from a number of countries; in the past from the UK and Holland, but now primarily from Japan, China, Taiwan and South Korea.

Liberia and Sierra Leone are practically the only countries in West Africa which have not established at least a printing and dyeing factory to manufacture these African textiles themselves. Each of the other coastal West African countries has established at least one modern cotton textile bleaching and printing plant based on one or more printing machines, each capable of producing 12 million yards a year.

In the cotton producing countries, Nigeria, Ghana, Senegal and the Ivory Coast, these plants also include spinning and weaving mills to supply the grey cotton goods to the printing plant. Ivory Coast has become a major exporter with 4 plants producing 65 million yards per year.

The weaving and printing plants should be integrated in the same factory under one management. The layout of the minimum one machine printing plant should allow room for vertical backward integration to weaving and spinning and room for expansion in units dictated by the 12 million yard capacity of the printing machine.

Existing Knitting Mills in Sierra Leone and Liberia

Sierra Leone and Liberia each have established small knitting mills producing sweaters, children's wear and underclothing. The plants are currently aimed only at the domestic market. Sierra Leone Knitting Mill is owned and managed by an Indian, N. Bushan, and is located at Wellington Industrial Estates near Freetown. The plant was built to serve the entire Sierra Leone market but today is operating at less than half capacity supplying 65% of the market. Output could be doubled with the addition of only labor for a second night shift.

The factory was built in 1965 at a cost of Le300,000, including a Le100,000 load from Standard Bank Ltd. It employs about 100 workers including 2 expatriate technicians. The raw material, cotton and nylon yarn, is imported from India, Japan, Taiwan and United Kingdom. The duty is 2-1/2¢ per pound on cotton and 3¢ per pound on nylon. The duty on competing knitted goods imports is 45% ad valorem (versus only 20% in Liberia).

TABLE VII-1

TEXTILE IMPORTS, LIBERIA AND SIERRA LEONE
1971-73 AVERAGE, 1974 AND 1980-85 PROJECTIONS

Country and Textile Group	Volume Millions Square Yards[1]				Value, Millions Leones or $		1974 Value Sq. Yd. Le or $
			Projections				
	1971-73	1974	1980	1985	1971-73	1974	
Sierra Leone							
Printed-Dyed Cotton Only	16.8	16.9	20.0	24.0	4.2	7.0	0.46
Total Cotton Textiles	32.9	32.8	39.0	46.0	7.8	13.1	0.40
Total Synthetic Textiles	9.5	8.9	11.0	13.0	2.5	7.2	0.47
Liberia							
Printed-Dyed Cotton Only	N.A.[1]	8.9	11.0	13.0	N.A.	4.7	0.55
Total Cotton Textiles	N.A.[1]	11.6	14.0	17.0	N.A.	6.1	0.53
Synthetic Textiles	1.7	3.0	4.0	5.0	1.2	2.3	0.76
Union Total							
Printed-Dyed Cotton Only	N.A.[1]	25.8	31.0	37.0			
Total Cotton Textiles	N.A.[1]	44.4	53.0	63.0			
Total Synthetic Textiles	11.2	11.9	15.0	18.0			

[1]Square yards have been estimated from pounds provided in trade statistics by converting at 4 yards to 1 pound for cotton textiles and 4.4 for synthetics. The square yard figures can be reduced to lineal yard figures by multiplying by 0.78. Thus the 1974 lineal yards of imported printed and dyed textiles for Sierra Leone was 13.2 million yards and 6.9 million for Liberia. The 1971-73 import data for Liberia was not usable because, among other reasons, large volumes of unregistered re-exports could not be isolated. The reported duty paid imports in 1971 and 1972 ran to 30 million yards! Much of these were reported to have been smuggled into Guinea and other neighboring countries.

Source: Annual Trade Statistics, Sierra Leone and Liberia

In 1969 the plant produced 76,896 dozens of garments; total sales were Le227,530; an average of 24 leone cents a garment. In 1974 production was down to 23,000 dozens totaling Le145,000, or an average of 52 leone cents per garment. This steady decline in production since 1969 was attributed by the owner to the stagnating economy "which has caused conservative buying habits".

Mr. Londen in his 1975 study of marketing opportunities for the Mano River Union observed that the knitting mills in both countries would benefit from a Union Customs agreement to create a Union market. This would provide a greater variety of products to the consumer and increase domestic sales at the expense of imports.

Defunct Polyester Weaving Mill in Liberia

An expatriate Lebanese industralist formerly operating industry in the Sudan brought capital into Liberia in 1971 to establish a 32-loom polyester textile weaving plant in Monrovia. This plant is capable of producing a wide range of suiting material in all patterns and blankets, and does not compete with cotton prints.

The factory was shut down, however, shortly after start-up trial runs in 1973 reportedly because the Government was not willing to grant an import tax concession on imported yarn. It has remained idle for more than 2 years, a considerable economic waste of capital in a country with such a paucity of modern industry. The owner has attempted to sell out, reportedly at the cost of machinery, to the Liberian owners of Mesurado with little success. (Mesurado is now abandoning its uneconomic apparel industry, Mesutex, after reportedly pouring $2 million into it.)

This same owner also brought in capital in 1971 to construct Liberia's only cigarette factory, and after 9 months of successful operation, in 1972 was subjected to a retroactive excise duty equal to that on imported cigarettes. This tax, coupled with the high duty on imported tobacco, destroyed the economics of the plant. The plant has shut down to one or two shifts per week, leaving the market again 90% to imported cigarettes. The owner after two years of fruitless attempts to obtain relief from the Government is also attempting to sell this plant.

The failure of Liberia and Sierra Leone during recent years to develop new manufacturing industry aimed at the domestic market coupled with the demise of some of their few existing industries does not provide an encouraging atmosphere to the foreign investor.

Pre-Feasibility Study for a Union Cotton Print Textile Mill

An UNIDO Textile expert, Mr. H. V. Blydenstein, prepared a pre-feasibility study in the fall of 1975 for an African print textile mill in Sierra Leone capable of supplying the Mano River Union market. The study is presented in two reports, one for a printing plant only, and the other including a spinning and weaving plant.

He estimates the capital cost of a single printing machine plant with bleaching capacity for 3 million additional yards at Le 5.3 million. The plant would employ 240 unskilled and semi-skilled (at Le 47/month and 45 skilled African staff at Le115/month). Expatriates would total 8 for the first 5 years; their total annual salary was put at Le212,000. This does not include the cost of the expatriate General Manager, Sales Manager and Financial Manager which would add another Le120,000.

It is understandable why the economics of smaller-scale modern manufacturing industry is not attractive in Sierra Leone and Liberia when the salaries of 11 expatriates total 166% of the total wages of the 285 African workers in the plant. The economies of scale increase significantly under these circumstances, as virtually the same expatriate staff can administer a 2 or 3 printing machine plant.

Assuming the printing plant operates at 75% of capacity, the annual sales will total 11.4 million yards of printed and dyed goods (about half of the Union market in 1980). Selling at Le0.66/yard, total sales are Le7.5 million. This selling price is some 20% above the lowest CIF cost of imported cloth but about equal to the higher prices prevailing during the last two years. The plant would process loomstate grey cloth imported, possibly from China, at Le0.24/yard CIF duty free. Total raw materials costs for imported cloth, dye and chemicals are estimated at $1.7 million.

The existing tariffs on African prints in Liberia and Sierra Leone are equivalent to 11.2 and 9.6 leone cents respectively. Mr. Blydenstein finds these levels would not provide adequate protection to assure adequate profitability for the printing plant. His calculations suggest a doubling of the duty level to approximately 30% ad valorem.

Mr. Blydenstein also examined the economics of vertically integrating the plant backwards by adding 12,500 spindles and 300 looms. He found that due to the low, virtually dumped, prices of grey cloth in 1975, that an even higher protection level would be required equivalent to some 60% on the CIF price of imported cloth. The economics would improve if domestic cotton can be grown in Sierra Leone at a cost below the CIF cost of imported Nigerian or Mali cotton.

Status of Efforts to Develop the Industry

The Sierra Leone National Development Bank has proposed to construct a 12 million yard printing/dyeing plant on a 20 acre industrial site at Grafton. The plant would be designed to allow later vertical backwards integration and expansion. They have approved a proposal from a German firm willing to take a 40% equity share and supply financing and management of the plant. The National Development Bank asked the Liberian Bank for Development and Investment to participate in the project, but required the response that "we already have two inoperative textile mills which we plan to resuscitate". As was noted above there is only one defunct textile mill - the polyester weaving plant produces a different product and would be complementary to the cotton textile plant. Mesutex is not a textile industry, but an apparel industry.

The cotton print project could be viable in the Sierra Leone market alone, with import restrictions, but would be more attractive as a Union Industry serving both markets which would allow more rapid expansion. The location of the plant at Grafton Sierra Leone appears attractive as it is close to the largest market, that of Freetown, and also to the possible future cotton producing area in Sierra Leone.

Recommended Mano River Union Textile Industry Program

Mr. Blydenstein's pre-feasibility studies provide adequate information for either Government or potential investor-manufacturers to evaluate the industry and no further study is recommended.

The proposal before the National Development Bank in Sierra Leone should recieve a sympathetic hearing for classification as a Union Industry under Joint Venture sponsorship by the two countries. Liberia has half the market of Sierra Leone, no competing project and no possibility of growing cotton to allow later vertical integration.

At the same time the existing polyester weaving textile mill in Monrovia could be resurrected as Liberia's contribution to the Union Textile Industry, again with joint sponsorship of the two countries.

Restored, its capital value would be $2 million, its employment 150 workers plus 3 managers, annual sales at $2 million, importing $0.5 million synthetic yarns.

RUBBER PRODUCTS - TIRE INDUSTRY (LIBERIA)

Economics of the Industry

In Liberia, Firestone, Goodrich and Uniroyal have large rubber plantations. Firestone's plantation established in the 1920's is the largest in the world. A number of large Liberian-owned plantations also produce natural rubber and recently a government-owned processing plant was created to process their production for export as crepe. More advanced processing could be developed. Total rubber exports in 1974 were 190 million pounds valued at $64.5 million. Forty percent went out as latex and the balance as crepe; 86% total exports were directed to the United States.

While rubber trees take some years to mature and require an investment in careful tending, they can be grown under small holdings or under estate conditions without significantly affecting the quality of the end product. Rubber has been accommodated into the cropping patterns of some of the small holder peasants in Sierra Leone and Liberia. In Sierra Leone rubber is being produced on small estates between Kenema and the Mano River and in the southeastern part of the country around Boajibu. The latter estate is the largest in the country, some 900 acres and is being expanded. The rubber could be processed for export in Liberia's existing process plants.

Natural rubber remains an important industrial raw material. It has been able to withstand the competition of synthetic rubber although the synthetics have taken the predominant share of the tire market in the last 20 years. Production and consumption of both commodities have been moving in parallel. However, oil prices have now forced up synthetic rubber costs to a point where natural rubber is now reclaiming some of this market. But more importantly for rubber exporting countries, the price of natural rubber will now remain on a higher plane because of higher synthetic costs.

Rubber products such as truck and automobile tires, tire retreading materials, conveyor belts, rubber shoes and some foam rubber products are imported into both the Liberian and Sierra Leonean markets. The largest proportion of rubber imports are tires and inner tubes for cars, trucks, buses, cycles and tractors. The value of these products in both economies totaled some $7.3 million in 1974. The foam rubber market is small and both countries have polyurethane foam manufacturing plants to handle the local markets.

For years, Liberia has attempted to have one of the three major rubber companies in Liberia establish a tire manufacturing plant there. This industry requires heavy capital investment, skilled management and supervision and importantly international marketing as the minimum economic size plant of 200,000 tires per year must also cater to the export market.

The imports of tires and tubes by Liberia and Sierra Leone from 1965 to 1974 and projections to 1985 are presented in Table VII-2. Car, truck and tractor tire imports

TABLE VII-2

IMPORTS OF TIRES AND TUBES, LIBERIA AND SIERRA LEONE
1965, 1970, 1974 AND 1980-85 PROJECTIONS

Country and Product	Imports in Units					1974 Value of Imports, $ or Le	
				Projections			
	1965*	1970	1974	1980	1985	TOTAL	UNIT VALUE
LIBERIA							
Car tires	28,000	52,500	41,800	55,000	75,000	$ 850,000	$ 20.30
Truck tires	3,800	12,400	10,300	14,000	20,000	782,000	76.00
Tractor tires	NA	4,000	5,000	6,000	8,000	2,540,000	506.00
Others (Cycles, etc.)	NA	4,932	5,700	9,000	15,000	21,000	3.70
Car tubes	NA	14,400	18,000	20,000	23,000	35,000	1.90
Truck and Tractor Tubes	NA	9,800	13,900	16,000	19,000	63,000	4.50
Others (Cycles, etc.)	NA	6,561	2,400	6,000	10,000	5,000	2.20
SIERRA LEONE							
Car tires	27,200	45,300	53,800	75,000	100,000	Le 802,000	14.90
Truck tires	18,300	27,500	12,500	20,000	30,000	587,000	46.80
Tractor tires	NA	1,900	3,000	4,000	7,000	630,000	211.00
Others (Cycles, etc.)	NA	10,400	18,600	23,000	30,000	12,000	0.60
Car tubes	NA	29,200	43,200	50,000	60,000	83,000	1.90
Truck and Tractor Tubes	NA	20,600	7,800	10,000	16,000	54,000	6.90
Others (Cycles, etc.)	NA	76,400	37,400	40,000	50,000	11,000	0.30
TOTAL UNION MARKET							
Tires (Car, Truck and Tractor)	NA	143,600	126,400	175,000	240,000		
Tubes (Car, Truck and Tractor)	NA	74,000	82,900	96,000	118,000		

*1968 for Liberia
Source: Annual Trade Statistics, Sierra Leone and Liberia

are projected to total 175,000 in 1980 and 240,000 in 1985. However, a domestic tire factory would likely produce tire sizes to supply about half of this market.

A feasibility study for an economic size facility producing some 300,000 passenger and truck tires, each in three sizes, was prepared by the Rumanian Government for Liberia in December 1974. According to the Study, Capital investment could vary between $30 and $48 million depending on the necessity for adding to electric power capacity. Labor force would be 1250 with 48 Expatriate Managers. Natural rubber tonnage requirements would constitute up to one-half of the total raw material needs, and would be domestically supplied. Synthetic rubber (required in a larger proportion for passenger car tires), nylon cord, carbon black and polyester cloth would all be imported. Total raw material costs are estimated at $10.5 million.

Annual sales are estimated at $20 million.

The large variety of vehicle and tire sizes in Liberia and Sierra Leone and the necessity to avoid an inefficient diversification of production in the tire plant means that it is possible to supply only about half of the market. Therefore, export markets must be sought for the surplus. The Rumanian plant would have problems entering into Western international trade as it would have difficulty in competition with well known producers and their international sales organizations. Only if the Rumanians assumed marketing responsibility for exported tires in Eastern Europe would the project be possible, coupled with import restrictions in the Union market.

The average 1974 c.i.f. cost of imported automobile tires in Liberia was $20.30, and $76.00 for truck tires. The production cost in an economic size tire plant using low cost local labor and expatriate management might be competitive.

Ghana, Nigeria, Zaire all have tire manufacturing plants, producing a small range of tire sizes to avoid inefficient diversification. The surplus is exported under the international brands of the company managing the plant. A tire plant in Liberia would be able to make a significant penetration of other West African markets only if it were sponsored by one of the major tire companies. Firestone has constructed tire plants in other African countries and markets in nearly all of them.

Tables VII-3 and III-4 present statistics on production and imports of tires in West African countries. These countries might comprise a market for a Mano River Union industry producing tires for passenger cars and trucks.

The largest number of West African tire imports, recorded in 1973, originated from the U.S.A. and BBC countries and bears out the fact that in spite of production in a number of these countries, a substantial number of tires are imported. Estimated imports of car and truck tires in 1980 is 1 million tires.

Exports of tires from Ghana and Nigeria were minimal in 1973; some 1400 passenger car and motorcycle tires plus 600 truck tires were exported from Ghana to Likua and Sierra Leone. Nigeria exported 1200 passenger car and motorcycle tires to Mauretania, Dahomey and Ghana in 1973.

TABLE VII-3

TIRE PRODUCTION IN GHANA AND NIGERIA, 1970 TO 1973

	Units Produced			
Country	1970	1971	1972	1973
Ghana	122	163	178	NA
Nigeria	266	268	223	307
Total	388	431	401	

Source: UN Economic Commission for Africa

TABLE VII-4

CAR AND TRUCK TIRE IMPORTS OF SELECTED WEST AFRICAN COUNTRIES, 1973
(Units)

Country	1973 Imports
Nigeria	91,000
Ghana	60,300
Ivory Coast	187,000
Senegal	49,300
Mali	27,300
Dahomey	21,800
Gambia	2,700
Upper Volta	12,700
Niger	10,200
Guinea	17,000
Cameroons	85,000
Total	564,300

Source: World Trade Statistics, 1973, United Nations

Since tires are easy to ship and transport costs are normally fairly low in relation to value, air freight transport has been successfully used to serve land locked countries in Africa.

Mano River Union Status

A Union industry tire factory would have to be export oriented because of the limited demand in the two Mano River Union countries. It must therefore be established in partnership with an outside firm with access to adequate markets and capable of producing a product at competitive cost and of adequate quality to enter those markets.

Liberia has a feasibility study and an offer to finance and manage a tire factory from Rumania which could serve the Union market. The proposal should be reviewed carefully by the two governments for its establishment as a Union Industry. The study will also serve the two Governments as a standard to evaluate or solicit proposals from other international tire manufacturers. A study for this industry by the Mano River Union would only be duplicating and involve an economic waste of resources. International tire manufacturers will undertake their own feasibility study if they believe the industrial environment in Liberia and the Union market will allow the construction of an economic export-oriented tire factory there.

GLASS CONTAINERS

Economics of Industry Establishment

The glass container industry is relatively capital intensive and requires skilled technical management. However, since glass containers are articles of common use and the transport cost of imports are high, many of the less developed countries have successfully established modern glass container plants, based upon local silica sand. Nigeria, Ghana, Ivory Coast, Kenya and Zambia have all established glass container plants, although with varying economic success.

The large and growing demand for bottled beverages, beer and soft drinks, and for medicinal and toilet packaging by domestic industry in the combined Sierra Leone and Liberia market has reached the volume required to make a glass container plant economically feasible.

Ocean shipping costs for glass bottles have always been high relative to their value because of their bulk. However, the large European manufacturers, with ready access to economical raw materials, have maintained such low costs that glass containers have commonly moved long distances from plant to user.

Metal containers, aluminum and steel, have been displacing glass containers in the industrialized countries. However, developing countries capable of producing glass containers will continue to find them more economic since lower income consumers are more disposed to return bottles*, and developing countries cannot produce, or recycle, tin or aluminum cans economically. (Environmental concern has given new impetus to the use of returnable glass containers in the developed countries).

A minimum economic size glass container plant would turn out 6,000 tons of glass products annually (or 30 million bottles) with a three shift operation. It would cost approximately $3.0 million. Annual 1980 sales revenue is estimated at $4.4 million. The domestic value added would exceed 50%.

Raw Material Availability, Labor Force and Infrastructure

Adequate silica sand exists on the beaches near Monrovia and Freetown. This raw material contributes about 50% of the raw material tonnage of a glass factory. Other raw materials which would have to be imported are soda ash, limestone and feldspar. Raw material costs average $350,000 annually. Domestic production and office labor costs of the 70 to 80 semi-skilled and skilled workers in the minimum size plant would reach $100,000 per annum.

*Sierra Leone Brewery has a 94% return on used bottles versus a 60% rate of return for Liberia's Brewery, Monrovia Breweries, Inc. The explanation given is that the undervalued Liberian bottles are being used to smuggle palm oil across the Guinea border. This trend has apparently existed since 1970 and this continuance would have to be assessed.

However, the cost of the required six expatriate technical and senior management would be expensive, possibly $180,000. Economies of scale increase above the minimum size plant as this high cost is spread over the larger production.

A stand-by diesel power plant is also necessary to keep essential plant operational in case of power failure. Power failures remain common in the two Mano River Union countries.

Demand for beverage bottles and other glass containers in the two Countries is estimated at 50 million units in 1980, and 70 million in 1985 (See Table VII-5). This Union Market could justify today a minimum plant described above with an output of some 30,000,000 bottles. The total production costs of such a plant would approximate $1.3 million, providing a cost per bottle of 6.0 cents. This is competitive with the 1974 average CIF cost for bottles imported into Sierra Leone and Liberia of 9.6 cents and 5.3 cents respectively.

The size of the combined markets would justify a plant of 6,000 tons (30 million units) of glass containers. The plant might be doubled, but this size plant prior to 1985 would have to depend on nearby export markets such as Senegal, Ivory Coast and possibly the Cameroons.

The 1973 imports of glass containers into 12 West African countries are seen in Table VII-6. These imports totaled some 200 million units and originated mainly from the U.S., U.K. and Western Europe. At that time no country in West Africa was producing glass containers. Since then, however, Ghana has erected one glass container plant with production meeting her demand. Nigeria currently has a consumption of 160 to 180 million units. They now have two plants producing 90 million units, and another larger plant is coming on stream shortly with a production capacity of 140 to 160 million units which will provide an export capability of up to 50 million units. The Nigerian industry benefits from the domestic natural gas supply. The Ivory Coast has established a small glass container facility to supply their domestic market.

Assuming that Ghana, Nigeria and Ivory Coast will satisfy their own consumption through production, demand in the remaining West African economies would grow from 1974's 25 million containers to approximately 40 million units (an annual growth rate of 7.0% which is the growth in imports of these countries in recent years).

Nigeria might be expected to obtain a good portion of this market because of her earlier start-up, proximity to these countries and the benefits of lower production costs and economies of scale. A plant exporting from Liberia or Sierra Leone might realize only a fraction of this market as this plant would be competing with the large European glass makers who do not readily relinquish their markets. However, combining this potential export market with the domestic markets in the two Union countries, could lead to an early doubling of plant capacity.

Manor River Union Industry Recommendations

Glass bottle manufacturing appears to be a good candidate for a Mano River Union Industry. Plant location could be alternatively at Monrovia or Freeport as silica sands, the major raw material, are apparently adequate at both locations; in addition, both areas share a substantial portion of the combined market volume.

While glass containers manufacturing plant and equipment proposals are readily available from supplier sources, it does appear prudent for the Mano River Union to sponsor an independent pre-feasibility study for this industry.

The Terms of Reference for this study would require alternate investment estimates for sites in Freetown and Monrovia. It would include determining the adequacy of and cost of raw materials. The optimum size of plant would be established and complementary equipment for start-up and to allow future expansion. Bands would be professionally sampled and tested for quality.

TABLE VII-5

LIBERIA AND SIERRA LEONE GLASS CONTAINER IMPORTS, 1965, 1970, 1974 AND 1980-85 PROJECTIONS

Country and Product	Import Volume, Millions of Units					Value, 000 Le or $		Unit Value Le or $
				Projections				
Liberia	1965*	1970	1974	1980	1985	1970	1974	1974
Glass Beverage Containers	4.9	12.1	22.9			537	1,220	.053
Other Glass Containers	2.1	5.4	2.4			210	160	.068
Glass Table Ware	-	0.5	-			49	90	.188
TOTAL	7.0	17.5	25.8	36.0	46.0	796	1,470	
Sierra Leone								
Glass Beverage Containers	0.6	3.9	3.9			229	370	.096
Other Glass Containers	1.1	5.1	2.6			166	280	.107
Glass Table Ware	1.4	2.0	2.2			063	140	.065
TOTAL	3.1	11.0	8.7	14.0	24.0	458	790	
Total Union Market	10.1	28.5	34.5	50.0	70.0			

*1968 for Liberia

Source: Annual Trade Statistics, Sierra Leone and Liberia

TABLE VII-6

1973 GLASS CONTAINER IMPORTS OF SELECTED WEST AFRICAN COUNTRIES
(millions of units)

Ghana	15.6
Ivory Coast	24.1
Mali	0.8
Niger	1.1
Nigeria	137.8
Senegal	7.0
Togo	N.A.
Upper Volta	2.0
Gambia	N.A.
Dahomey	2.2
Chad	1.3
Cameroons	9.4
Total	201.3
Total less Ivory Coast, Nigeria and Ghana	25.0

Source: World Trade Statistics, United Nations

AGRICULTURAL MACHINERY AND HAND TOOLS

Economics of Industry Establishment

This is an industry wher significant economies of scale exist for large automated manufacturing plants, but where capital requirements are also substantial. Even if piece work technology prevails, a metal fabricating facility requires skilled management and a skilled workforce. Provided these are available, good quality tools can be produced. The industry can also cater its product to the economic conditions prevailing in Sierra Leone and Liberian agriculture.

In Freetown there is a large railway workshop which is virtually defunct since the abandonment of the Sierra Leone Railway. Much of the machinery in this workshop is in good condition but is standing idle. Part of the plant could be adapted, with a modest additional investment, to produce agricultural machinery and hand tools. The products could include plows, harrows, cultivators, harvesters, spades, hoes, shovels, axes, machetes and sickles.

Only a small proportion of the machinery in the workshop is suitable for the manufacture of small implements. Additional hydraulic and mechanical presses, saws, lathes, rounders, sanding machines, grinders, welding equipment, shears, riveters, paint spray equipment, forging dies, tongs and degreasing receptacles would be required. Assuming that the workshop at present contains 25% of the equipment needed, additional investment might rise to the $500,000 level. Replacement value of the completed plant might be Le2 million. Land and building costs are minimal since the existing facilities have little alternative economic use.

There is also a substantial amount of heavier machine tools and machinery in the workshop which could be utilized for the manufacture and repair of machinery and the production of such products as truck and bus bodies. There is a significant Union demand for maintenance services from the mining, manufacturing and ship repair industries.

Raw Material Requirements and Labor Force

Raw materials such as steel, tubing, bars, spring steel, and castings would have to be imported and constitute a major expense, with the 1980 total cost in 1974 import prices estimated at $850,000. Lumber could be furnished locally. Labor skills needed are of a high order and the old workforce contained many such workers. Total workforce is estimated at about 150. Moreover, a number of expatirates would have to be employed initially for organizational, production planning, engineering and overall direction. An expatriate management staff of six would cost Le180,000 a year. Utility inputs are low.

A minimum economic size facility would be producing 1800 units annually of the larger agricultural machinery such as ploughs, harrows and cultivators, and upwards of 300,000 hand tools. Both of these production units could be one shift operations initially. Sales volume in 1980 is estimated at $2,500,000.

Market Analysis

The demand for agricultural machinery and implements has been estimated from import statistics as no production exists at present in either Sierra Leone or Liberia. (See Table VII-7.) The demand for ploughs, harrows, harvesters and cultivators has been growing due to increased mechanized cultivation. This trend will continue and Union demand is estimated to reach 2900 units in 1980, and 3700 in 1985. Demand for the simpler farm hand tools has remained fairly stable because, in these poor rural peasant economies, these tools are carefully preserved and replacement rates tend to be low. A Union demand of 950,000 units is projected for 1980 and 1,100,000 in 1985.

In 1974 the average CIF cost of small hand tools imported into Sierra Leone was Le1.00/unit and the average cost of imported agricultural machines was Le337.00/unit. Average import costs were somewhat higher in Liberia (See Table VII-7). The railway workshop could produce much of the estimated Union requirements projected for 1980; in fact the demand might justify a larger operation than the minimum economic size. There is not much possibility that this industry would be export oriented, as the costs of production initially would likely be 20-25% above international prices, requiring protection.

In 1975, the Hungarian Government completed a feasibility study on rehabilitating the railway workshop for the Sierra Leone Government. They recommended a program to reorganize and re-equip the Railway Workshop, and offered to supply three technical managers to initiate the program at no labor cost.

Mano River Union Status

This industry should be considered for classification as a Mano River Union Industry. The most economic location is Sierra Leone considering its larger market, the existence of the railway workshop, and the large unemployed skilled workforce. Liberia lacks such a workforce. The Sierra Leone Government has in hand a feasibility study and a proposal from the Hungarian Government for the resurrection of this worshop which only awaits implementation. No further feasibility study by the Mano River Union is recommended.

TABLE VII-7

LIBERIA AND SIERRA LEONE IMPORTS OF AGRICULTURAL MACHINERY AND HAND TOOLS
1970, 1974 AND 1980-85 PROJECTIONS

Country and Product	Units Imported				1974 Value of Imports, Leones or $	
			Projections			
	1970	1974	1980	1985	Total (000)	Per Unit
Liberia						
Agricultural Machinery and Appliances including Machinery for Harvesting and Threshing	375	500	700	920	395	790.00
Hand Tools and Machetes	400,000	400,000	450,000	500,000	546	1.36
Sierra Leone						
Agricultural Machinery and Appliances	130	1,500	2,000	2,500	505	337.00
Machinery for Harvesting and Threshing	60	169	200	280	109	645.00
Hand Tools and Machetes	416,200	408,700	500,000	600,000	405	1.00
Total Union						
Agricultural Machinery	565	2,169	2,900	3,700		
Hand Tools and Machetes	816,200	808,700	950,00	1,100,000		

Source: Annual Trade Statistics, Sierra Leone and Liberia

SOAP AND DETERGENTS

Economics of Industry Establishment

The soap industry is one of the first and most economic industries established in each of the West African countries. The manufacturing process for washing bar soap is simple, involving boiling vats of vegetable oil (bleached palm oil) or tallow with imported caustic soda and then pouring onto a cooling table for hand or mechanized cutting.

The principal raw material in washing soap manufacture in most West African countries is vegetable oil, but in Liberia and Sierra Leone animal tallow is imported. Vegetable oils can be substituted for tallow; however, until mid-1975, imported tallow was cheaper than domestic palm oil given the short fall in domestic supply.

Detergent manufacturing, or blowing, plants are more sophisticated and require a 1000 ton per year market to be economic. Unilever has a market of this size in Liberia and Sierra Leone today supplied from their plant in England.

Because the Sierra Leone and Liberian soap factories require 2 or 3 high cost expatriate managers, they are not very profitable below a 2,000 ton/year production level. The economies of scale are significant in the plants due to the fact that additional shift operations doubling or tripling outputs can be accomplished with the same management staff by adding only semi-skilled workers and laborers.

Raw Material, Labor Force and Infrastructure Available

In Sierra Leone Chandrai operates a laundry bar soap plant where imported tallow and caustic are heated in small boilers to produce some 1,500 tons/year. They are planning a new factory in May 1976 nearer Freetown with a production capacity of 6,000 tons/year of laundry soap and 800 tons/year of toilet soap.

In Liberia, the Mesurado Group is producing laundry soap, at the level of 2,800 tons/year. They also partly manufacture Lux and Lifebuoy toilet soap by blending imported soap "noodles" with color and perform in a machine which extrudes bars to another automatic molding and wrapping machine. The plant is capable of producing some 300 tons per year of Lux and Lifebuoy toilet soap and could be integrated backwards to the manufacturing of the soap itself (the domestic value added in the present operation is small less than 15%).

The Sierra Leone industry is competently managed by Indian owners. In Liberia, the Liberian-owned Mesurado Group is managed by an English expatriate staff. They have achieved a predominant marketing position in packaged detergents through their use of the Unilever license and through Government granted import restrictions.

No detergent production is undertaken in Sierra Leone. In Liberia the Mesurado Group is packaging 350 tons annually. In June 1975 all other detergent imports were

barred by the Government, providing a monopoly to Mesurado. Mesurado only hand packs bulk Unilever "Omo" into imported boxes. The small domestic value added by the packaging operation (far less than 15%) means that the operation cannot qualify for support as a Mano River "Union Industry."

Another Liberian manufacturer, Liberian Industries Ltd. set up a detergent manufacturing plant to actually produce their own brand of detergent based on imported raw materials, thus avoiding foreign licensing costs. However, without realizing any Government support the factory is reduced to working only one day per week. The plant could have produced enough detergent for the entire 1,100 ton/year Union market in 1974.

The investment in a new detergent producing facility might total $1.0 million. The facility would employ some 30 workers, plus 4 managers (expatriate). Annual sales would gross about $1,300,000 with costs of raw materials estimated at $500,000, at 1974 import prices.

In both Sierra Leone and Liberia, palm oil and palm kernel oil are available as a substitute for imported tallow. In Sierra Leone, a palm kernel crushing plant operated by the Ministry of Trade and Industry produces 50 tons/day of Palm Kernel Oil, most of which is exported, although some is sold on the local market for cooking (this industry is described in a separate section). The European price of palm kernel oil reached a record high of Le1100/ton in 1974, but by mid-1975 dropped to Le350/ton. While palm kernel oil normally brings a premium price, the realized FOB price is now actually lower than the imported cost of tallow at Le350/ton. Ocean transport costs work against Sierra Leone and Liberia in both directions encouraging the utilization of domestic palm and palm kernel oils for soap and margarine manufacturing. The soap factories can also turn to bleaching palm oil, for soap manufacture, if they could be convinced that adequate supplies would be available at prices competitive with tallow.

Market Analysis

The market for soap and detergents, including projections to 1985, is set forth in Table VII-8 for both Sierra Leone and Liberia.

In the Sierra Leone market, the principal washing soap competition is a Russian import selling at Le700/ton, after paying a 40% tariff. The Sierra Leone producer, J. T. Chandrai, sells at Le500/ton, including a 22-1/2% excise tax. The Russian brand has had up to half of the market but it would appear that the local producer is competitive. In the area of toilet soap, Chandrai in their new plant will have to compete with the Unilever Brands which have a strong hold on the market, and with inexpensive Asian imports.

In Liberia, Mesurado washing bar soap has no effective competition and they are marketing the Unilever brand toilet soap. Liberian Industries Ltd. at present without assistance cannot compete with Mesurado's Unilever detergent "Omo" which holds

TABLE VII-8

LIBERIA AND SIERRA LEONE SOAP AND DETERGENT MARKET, 1970, 1974, AND 1980-85 PROJECTIONS

Country and Product	Demand (000 tons)		Projections	
	1970	1974	1980	1985
Liberia				
Soap	2.0	3.5	5.6	7.0
Detergents	0.5	0.5	0.8	1.1
Sierra Leone				
Soap	8.3	11.0	15.0	19.0
Detergents	0.5	0.6	0.9	1.4
Total Union				
Soap	10.3	14.5	20.6	26.0
Detergents	1.0	1.1	1.7	2.5

Source: Annual Trade Statistics, Sierra Leone & Liberia

90% of the market. It is the opinion of most importers that an unknown detergent brand can be marketed in free competition only if there is initially a 30-40% price differential coupled with a heavy investment in publicity.

The Projected demand for laundry soap would appear to be within the existing domestic production capacity in both countries assuming that double shifts are employed. Export possibilities between the countries, should there be any surplus, appear difficult in the face of low cost foreign supplies. The new Chandrai washing bar soap plant could provide up to 12,000 tons/year on two shifts which would supply the Sierra Leone 1980 market, if imports were curtailed by import licensing.

If the Mesurado Group integrates backward its toilet soap blending and wrapping to complete domestic manufacture, it could benefit from Union marketing arrangement with Sierra Leone.

Detergent production could be undertaken for both countries by Liberian Industries Inc. who could expand to produce enough to satisfy the Union market, if Unilever brand allegiance could be overcome. Alternatively, if Mesurado establishes a detergent manufacturing plant on license from Unilever, they could supply the entire

Union market with the Unilever brands which already have 80-90% of the Union market.

Mano River Union Policy

There would appear to be no need for any Mano River Union Industry classification for laundry bar soap as both countries have factories capable of supplying their local market. This was the recommendation of the Mano River Union Inter-State Trade and Marketing Study conducted by Mr. A. K. Londen, of the International Trade Centre, UNCTAD, in August 1975 (ITC/DFO/149).

However, in detergent manufacturing Liberian Industries Ltd. could supply the entire Union market from their existing plant. At present, imported Unilever detergents have 80-90% of the market in both countries. Mesurado's packaging "industry" does not produce sufficient value added to qualify for Mano River Union support. However, Mesurado has been discussing the possibility of establishing a detergent manufacturing plant to produce the Unilever brands for both markets. As both manufacturers are capable of making their own feasibility studies and apply for Union Industry status, there would appear to be no need for the Mano River Union to undertake any further pre-feasibility studies for this industry.

SALT

Economics of Industry Establishment

Production of salt from sea water by solar evaporation is carried out economically in many parts of the world where geography and climate are favorable for such an industry. In West Africa solar salt production occurs in Ivory Coast, Ghana, and Senegal. Despite the longer rainy season in Sierra Leone production of salt by solar evaporation of sea water may be economically feasible. Sea water at Yawri Bay off the South East Coast of Sierra Leone is reported to have salt content as high as 3.9%, one of the highest in the world, contributing to the salt recovery rate. This factor coupled with high temperature tends to offset the high humidity and long rainy season making salt production in Sierra Leone possible. Additionally, coastal swamp land in Sierra Leone suitable for the operation of a salts works has not been valuable for agriculture and can be secured at reasonable rents.

The basic premise on which solar evaporation industry operates is that there be a constantly flowing amount of saline water into a salt works generally through a passageway such as a creek or river estuary up which the sea water passes. The water is then pumped into reservoirs and thence into a system of shallow concentration ponds. The ponds are generally interconnected by channels and are so arranged that the increasingly saline water can flow from one pond to another in a designed sequence. In these ponds, brine is exposed to evaporation of sand and wind, and then allowed to flow into crystallizing ponds where it is collected as salt.

Raw material costs are not greater and very little in the way of skilled labor is needed. As the solar works operate during the dry season, workers who are released can go back to their farms during the wet season. A minimum expatriate staff is necessary. Power needs are not large and energy is supplied by small generators. The pumps are powered by diesel engines. This is not a capital intensive industry. Earth moving equipment is utilized to prepare the ponds thereafter only pumps, harvesters, conveyor belts and weighing machines are utilized in collecting the salt. Salt is taken from the solar works by truck and transported by road to distribution centers. Salt could be bagged at the works for the market in the conventional 30-pound bags.

Osman Thomas Brothers Ltd. has recently started a solar evaporation plant in Ribbi Chiefdom in the Moyamba district off Yawri Bay in Sierra Leone. The site is very close to the sea on a small tidal river. They have leased 2000 acres and cleared and prepared 150 acres and report a production of 600 tons of salt in 1975. The use of manual rather than mechanized labor for clearing land, and bad technical management have reportedly slowed production. By 1980 this concern says it will be producing 10,000 tons annually or most of Sierra Leone's requirements.

Solar Industries Inc. Ltd., Freetown concern, has plans for the development of a salt pond in Bumpe Chiefdom, eastward along the coast for the Osman Thomas facility where 4000 acres are reportedly available. This company announced that by

utilizing mechanized means of clearing and preparing land that they could produce annually by 1980 more than the estimated 23,000 ton combined Union market.

Table VII-9 presents the salt imports of Liberia and Sierra Leone in 1970-74 and projections for 1980 and 1985.

No solar evaporation project is contemplated in Liberia. All of its salt is imported. There is a proposal to install a salt grinding and sacking plant based upon imported Senegal bulk solar produced salt, similar to the operation in Freetown. The Liberian entrepreneur stated in his proposal to the Government that solar salt production was not economic in Liberia because of the high rainfall.

Salt projects in Sierra Leone might be capable of producing by 1980 adequately to satisfy both the Liberian and Sierra Leone markets. If so they would benefit from "Union Industry" status.

The current retail price for a 30 lb bag of salt packaged locally is Le1.10. The promoters of the industry on Sierra Leone anticipate costs of production as low as 50 cents/bag. If realized they could compete with Senegal salt, without protection.

Mano River Union Status

It would appear that a Sierra Leone solar salt industry might classify as a Mano River Union Industry if it can be developed economically. However, since the technical management of this industry is important, it remains to be seen whether the existing entrepreneur will be able to produce to satisfy the market, and Solar Industries Ltd. remains an unknown factor.

As the two existing promoters have adequate planning resources no feasibility studies need be performed by the Mano River Union for this industry.

An efficient salt production works will require up to 160 workers such as drivers, mechanics and manual workers. One manager and two engineer technicians will be necessary. The Managing Director could be a Sierra Leonean, but there is an advantage in appointing a person with experience in the salt industry. The technicians would be expatriates initially.

Capital investment is estimated at $1 million. Volume of sales in 1980 is estimated at $0.6 million. Raw material imports are estimated at $100,000.

TABLE VII-9

LIBERIA AND SIERRA LEONE SALT IMPORTS,
1970, 1974, AND 1980-85 PROJECTIONS

Country and Product	Volume of Imports, 000 Metric Tons				Value Imports, 000 Le or $		1974 Value per lb.
			Projections				
	1970	1974	1980	1985	1970	1974	
LIBERIA							
Sacked Salt		2.9				250.8	.04
Packaged Table Salt	___	1.4	___	___	___	162.4	.05
Total	3.1	4.3	6.0	7.2	172.6	413.2	.04
SIERRA LEONE							
Bulk Salt (from Senegal)	10.2	13.0			278.4	265.1	.01
Packaged Table Salt	0.1	0.4	___	___	7.9	47.0	.05
Total	10.3	13.4	17.5	21.0	286.3	212.1	.02
TOTAL UNION MARKET	13.4	17.7	23.5	28.2			

Source: Annual Trade Statistics, Sierra Leone & Liberia

DRY CELL BATTERIES

Economics of Industry Establishment

Union Carbide Corporation recently made a study of the dry cell battery market in Sierra Leone and Liberia. No investment was considered at this time because the combined Union market was less than what would be required for a minimum economic size plant, considered to be 60 million batteries per annum, producing 3 different battery sizes (AA-Cell, C-Cell and D-Cell). Two other companies, whose names could not be obtained, also recently turned down proposals to set up a dry cell battery plant in Sierra Leone.

Union Carbide Corporation would consider installing a minimum size plant operation producing 30 million units if it could be sure that a future Union market would justify production of 60 million units of all 3 types of batteries.

The sponsoring firm establishing a battery factory does so because it anticipates making part of its profit from the assured market for carbon, zinc and other raw materials. The industry would have a small domestic value added, and would likely produce at a price closer to the 19¢ per battery paid by Liberia for its imports, than the 10¢ paid by Sierra Leone. Sierra Leone batteries in 1974 were imported from Asian producers, four-fifths from Singapore. Union Carbide owns and manages the dry cell battery operation in Singapore. This is a very large economic size operation producing at low cost. Imported batteries from the United States of America and France cost some 30¢ each.

Estimated capital investment for the plant (30 million units) is $2.0 million. Annual sales would be approximately $2 million. Some 35 workers plus two expatriate managers and one engineer would be employed. All raw materials would be imported, costing some $900,000 per year.

Market Analysis

The demand for dry cell batteries in Liberia and Sierra Leone is taken from import statistics and is presented in Table VII-10.

The import data for Liberia may not represent the entire market as unregistered (smuggled) imports are common. For example, the 1973 reported imports into Sierra Leone were 29 million, many of which were reportedly smuggled to Guinea.

However, if a domestic battery factory is established requiring upwards of 100% duty protection against foreign imports, this will significantly reduce the demand figures shown above for Sierra Leone, as the demand among the poorer population is elastic.

TABLE VII-10

IMPORTS OF DRY CELL BATTERIES IN
LIBERIA AND SIERRA LEONE
(1970, 1974 and 1980-85 Projections)

Country & Product	Volume, Millions of Units				1974 Value, (000) Le or $	1974 Unit Value, Le or $
			Projections			
	1970	1974	1980	1985		
LIBERIA						
Flash Light Batteries	0.7	1.5			131	.09
Other Primary Cell Batteries	1.3	3.7	___	___	851	.28
Total	2.0	5.2	7.0	10.0	982	.19
SIERRA LEONE						
Primary Cell Batteries	13.4	12.1	16.0	22.0	1,233	.10
TOTAL UNION	15.4	17.3	23.0	32.0		

Mano River Union Status

The dry cell market in the Union countries does not appear large enough for a minimum size economic plant at this time. However, if this industry is placed on a deferred basis and examined again within 2 years, it may be possible, from the market view, to recommend this industry for Mano River Union status. The location suggested is Sierra Leone since it has by far the largest market, providing distribution economies to the plant. However, transport costs are small relative to value. No feasibility study is recommended as Union Carbide, or other promoting entrepreneurs, will provide their own pre-investment studies which can be evaluated by the Mano River Union and the two Governments.

SARDINELLA COASTAL FISHING

Economics of Industry Establishment

Fish is the main source of animal protein in Sierra Leone and Liberia, with consumption at 20 Kg/per capita in Sierra Leone and 25 Kg in Liberia, high by international standards. It is well known that fisheries resources off the West African Coast are rich, with total catches having increased from 1.2 million tons to about 3 million tons currently. A large amount of these catches are landed by long distance fleets of non-African countries. Present domestic landings of fish in Sierra Leone amount to about 60,000 tons annually and in Liberia 15,000 tons annually. Most of this is herring caught by canoe fishermen. Landings by locally registered fishing vessels (ordinary trawlers and shrimp trawlers fishing in nearby coastal waters) amount to about 2500 tons annually in Sierra Leone and 3000 tons in Liberia. Tuna is landed in frozen form, 3-4,000 tons/year, by foreign vessels in Freetown at Kissy Dockyard, which is leased by Fish Industries Ltd., and re-exported to European and U.S. canneries. About 16,000 tons of frozen fish, excluding tuna, are purchased from foreign trawlers.

The distribution of imported frozen fish is mainly handled by the Liberian owned Mesurado Company who until recently operated in Sierra Leone in a joint venture agreement with the Sierra Leone government. Some 29 cold storage depots exist in Sierra Leone and Liberia. The only adequate facilities for unloading, servicing and repairing of fishing vessels in the two countries are those owned by the Mesurado Group.

The areas of fishing enterprise which have been considered for Mano River Union status are long distance fisheries, coastal trawling, coastal tuna fishing, and coastal purse/seining for Sardinella.

Long Distance Fisheries

According to the report of the FAO Industrial Fisheries Project Identification Mission to the Mano River Union issued in February-March 1975, any new Sierra Leone/Liberian owned and operated long distance fishing venture would be risky and uneconomic. The catch of 8-10 tons/day which is necessary to offset the high cost of operation (expatriate personnel and transport to export markets) is not likely to be achieved on the basis of resource data available. The report suggests that a joint venture agreement might be considered by a local company such as Liberia's Mesurado (one of the efficient fish trading companies in West Africa) with a foreign company experienced in distant water operations.

Coastal Trawling

In Sierra Leone four private fishing companies are operating nine trawlers in inshore and coastal waters. In Liberia, the Mesurado Group operate twenty-three shrimpers and six fish trawlers. Fish are landed fresh and part are frozen on shore. Increased landing could probably be obtained by enlarging the present fishing areas off both

Freetown and Monrovia. There are obvious requirements for skilled local personnel, greater availability of preservation and freezing facilities and improved landing facilities. Nevertheless, these investments should be undertaken by the expansion of existing national companies. No requirement for a union industry exists.

Coastal Tuna Fishing

Tuna stocks in the coastal waters of Sierra Leone and Liberia are exploited only to a limited extent at present, and tuna suitable for canning has an established world export market with prices continuing to show an uptrend. Local demand for fresh tuna, however, appears to be limited. Nevertheless, based on current world market prices of skipjack tuna ($395/ton F.O.B. Freetown with medium term prices rising to $400/ton) a financial return of only about 5% can be expected. This financially unattractive estimate is based on the average yearly catch of 460 tons realized by the Japanese pole and line live bait boats fishing in Sierra Leone waters in 1973 and 1974, and estimated annual costs of operation of $180,000 of a 50-ton GT pole and line bait boat.*

In view of the uncertain short term outlook for tuna prices, inadequate knowledge of the catch rates and length of catching season, a coastal tuna fishing venture appears risky and is not recommended as a Mano River Union industry at this time.

Coastal Purse Seining for Sardinella

Concentrations of Sardinella Elba and Sardinella Aurita have been detected off the coastal waters of Sierra Leone near the Guinean border and appear to be far more numerous than species found in Liberian waters. The marketing of Sardinella in frozen form seems to offer the best immediate prospects for a considerable increase in the fish consumption among the lower income groups in the interior parts of the two countries. The Mesurado Group of companies in Liberia and their joint venture counterpart in Sierra Leone import frozen Sardinella from foreign trawlers and distribute them through their cold storage chains. Neither of these companies conducts fishing operations for Sardinella.

In view of the location of the main known Sardinella stocks and the need to have a short steaming distance to the freezing plant, Freetown would be a suitable base for fishing operations. Since the only unloading facilities for fishing vessels are located in the Kissy Harbor area, this would seem the most logical location for the plant.

For a sardinella purse-seining freezing venture, the following facilities are required on shore: ice plant, chill room, freezing equipment, cold storage, workshop and offices. Since all of the above facilities except freezing equipment are available both in Kissy and Murraytown and are at present working well below capacity, it would

*Estimates provided in Report of the FAO Industrial Fisheries Project Identification Mission to the Mano River Union, February/March 1975.

make little sense to acquire new equipment for a first phase of Sardinella freezing. In fish freezing operations, the economies of scale are not so large, and the investment cost for a freezing unit of 40 tons per day capacity is about 5 times that of an 8-ton/day unit. The current CIF cost of a plate freezer, the most suitable way of freezing Sardinella, with an output of 8-10 tons/day, or a vessel catch, is $25,000. The total equipment requirements to handle 6,000 tons/year, or a 3 vessel catch, would be in the order of $300,000. Cost of 3 vessels would approximate $1,200,000. Fishing costs per ton of fish are estimated at $85; and ex-plant costs at $160/ton, including the costs of freezing, handling and packaging. Estimated sales for a 3 vessel catch are $1,800,000 annually. Labor would include a captain and engineer and 12 crew members for each vessel. Shore personnel would consist of a manager, engineer (both initially likely to be expatriates) and some 30-40 workers employed in the various plants and workshops on shore.

Market Potential

Imports of fish, fresh and frozen, into Sierra Leone are presented in Table VII-11.

TABLE VII-11

SIERRA LEONE IMPORTS OF FROZEN AND CHILLED FISH, 1970, 1973, AND 1980-85 PROJECTIONS

Imports in Tons				1973 Value Imports, Leones	
		Projections			
1970	1973	1980	1985	Total	Per ton
10,842	10,806	20,000	40,000	1,369,000	127

There are no comparable statistics for Liberia since most frozen fish imported into Liberia are caught in coastal waters and are not considered as imports. Much of the Sierra Leone catch was, however, re-exported.

It is estimated that frozen Sardinella might account at present for some 10% of frozen fish imports of both countries or perhaps 2000 tons a year. The long range estimate, however, puts consumption in both countries at 10 Kg/capita (the current Nigerian rate) or some 40,000 tons annually. This projection is based on trends in the Ivory Coast which showed consumption of frozen Sardinella increasing at 30% annually in the 1970s, with about 50% of the frozen fish classified as Sardinella.

There is a large potential market for frozen Sardinella in West Africa. The Ivory Coast (and Upper Volta) imported some 50,000 tons in 1974 and Nigeria imported approximately half this volume. Ghana imported some 3,000 tons of frozen Sardinella in 1974 although its domestic fishing sector is one of the most efficient in Africa. Other importers of frozen Sardinella are Mali, Niger and Chad. Much of the imports to Ivory Coast and Ghana are caught in the ocean off Mauritania, Senegal

and Gambia. Nigerian consumption of frozen fish is largely from its own coastal waters, but there are limits to increasing yields from this source.

West African CIF prices of frozen fish in 1975 were about $300/ton with prices expected to rise in the future. Given an estimated ex-plant cost of $160/ton, the establishment of a Sardinella purse/seining and freezing venture appears to be a viable proposition.

Another alternative to exploiting Sardinella on an industrial scale would be to produce fish meal for either human or animal consumption. Although the use of fish meal in African countries has been quite limited, it can be expected that the expansion of livestock farming (chicken, broilers, pigs) could lead to higher demand in the future. Demand in Liberia and Sierra Leone may rise to 3-5,000 tons/year by 1980 and double again by 1985. Currently fishmeal is imported and used as an ingredient in animal feed by local animal feed concerns in both countries.

The 1975 world market price for fish meal dropped to $250/ton CIF Hamburg, substantially less than in 1974 due to the recovery of Peruvian fisheries. For a fish meal plant based in Freetown, the sales price needed to cover all costs including catching the fish is $365/ton. Current CIF prices would have to increase to $450 - $500/ton to make such a facility feasible. For the short term, prospects appear slim, but over the long term, following an expected increase in the prices of fish, the prospects are better. Increased expansion of the domestic sector could in a few years time result in a demand which would make it profitable to set up a small fish meal venture.

Mano River Union Policy

Ventures into long range fishing, coastal tuna fishing and fish meal preparation are not recommended for Mano River Union consideration at this time because of their riskiness and current low world prices. However, a coastal Sardinella fishing venture operating from Freetown appears promising, and should be considered for Mano River Union status.

SECTION VIII

ANALYSIS OF EXPORT INDUSTRIES RECOMMENDED FOR MANO RIVER UNION SUPPORT

The following proposed export industries are analyzed in this section:

1. **Iron and Steel Mill** - **Liberia**
2. **Alumina** - **Sierra Leone**
3. **Paper Pulp and Plywood (Gola Forest)** - **Both Countries**

IRON AND STEEL MILL - LIBERIA

Economics of Industry Establishment

Liberia has been one of the world's major iron ore exporting countries for over a decade with total exports reaching 25.3 million tons in 1974, valued at $262 million. More than half of this output, 12.8 million tons, was shipped from Buchanan from the Lamco mines at Mount Nimba. The total exports of iron ore have not increased significantly since 1970 when 23.4 million tons were exported, although the total exported as pellets rose from 1.8 million tons in 1970 to 4.2 million in 1974. The declared value of iron ore exports has risen from $6.50 per ton in 1970 to $10.40 in 1974. However, the government's revenue per ton has remained unchanged at $0.56 and therefore total government revenues have not increased since 1970. Iron ore exports account for two-thirds of the total value of Liberian exports and the industry employed 10,710 Liberian workers and 1,060 expatriates in 1974.

The Liberian government has attempted since 1963 to develop an export iron and steel industry at Buchanan. The agreement with the mining company, Lamco, provides that they will supply whatever iron ore is required for a domestic industry. In 1964, Voest (the state-owned iron and steel company of Austria and developers of the LD oxygen steel-making process) prepared a feasibility study for an 800,000 ton integrated iron and steel export industry at Buchanan. The project was based upon the latest technology and initially sized by a single large modern 800,000 ton blast furnace feeding an LD (oxygen) steel-making shop and continuous-casting facility. No coking oven was required as coke would be imported as a back-haul in the iron ore carriers from Europe. Two smaller rolling mill lines would aim at the most common steel product imports of Africa: (1) small structural shapes, angle bars and rod, and (2) sheet steel, including galvanized roofing. The initial blast furnace would be followed by a second in 4 years (the timing dictated by furnace relining requirements) and a doubling of the output of mostly semi-finished ingot and billet to be sold to other steel rolling mills in Europe and Africa.

Kaiser Engineers joined with Voest in 1965 to propose a financial feasibility study; however Liberia commissioned a UNIDO financed study by W. S. Atkins (U. K.) in 1967 of the West African market opportunities for the mill instead, and attempted to gather West African support for the project. The Atkins study and succeeding negotiations brought the project no nearer fruition.

The new 1974 Voest proposal now envisions the same project but raises the initial plant sizing to the 1.5 million tons capacity of the two blast furnaces, and aims most of the output at the rising requirement for semi-finished steel (ingots and billets) in the European countries. During the past 10 years, European steel mills have failed to expand steel-making capacity to keep pace with market requirements. This fact was evidenced in the world-wide steel shortage experienced in 1973-74, when the prices of semi-finished steel doubled to $260 per ton.

In November 1975, the Liberian government accepted an offer by the Austrian government to update their cost estimates and feasibility study for the project and Liberia agreed to pay a modest $21,000 of the $140,000 cost of the update.

However, earlier, the Liberian Ministry of Agriculture had requested the Rumanian government to prepare another feasibility study for an integrated steel mill at Buchanan, but limited to only 250,000 tons annual capacity. The Rumanians submitted their report in early 1975, which included alternate costs based upon blast furnace technology, or direct reduction and electric furnace technology. Both mills producing 250,000 tons of small structural shapes and wire.

The Rumanian study came to the correct conclusion that the blast furnace was the cheapest in capital and operating cost, but the mini-sized blast furnace and LD steel-making facility resulted in high capital and high operating costs. The capital cost totaled $239 million, including $57 million for infrastructure. The operating cost was estimated at $220 per ton for ingot and billets, and $284 for rolled products. These high costs reflected the high market prices realized for coke during the shortage of 1974. The study assumed prices delivered Buchanan of $116 per ton for coke, $12.50 for iron ore delivered over the fence from Lamco, and $135 per ton for fuel oil! All too high for a realistic opportunity cost analysis.

However, the real diseconomy of the small size plant is seen in the labor force where the Rumanians proposed to supply 819 Rumanian skilled operators, managers and engineers to work alongside a Liberian work force of 1,492. This same expatriate work force, or less, could manage an economic size steel mill six times larger and spread their high cost over the larger output.

The basic economic attractiveness of the Voest proposal lies in the fact that the 15 million tons of iron ore carriers from Buchanan return empty in ballast from the economical coke-producing centers of Europe (where coke is a joint product of the chemical industry). They could carry the 1 million ton coke requirements for the steel mill at little economic cost (along with limestone from Dakar). The second advantage is that the steel mill can eliminate the high capital cost of the coke ovens and by-product plants from its initial capital cost.

In 1974, Voest estimated that the 1.5 million ton steel mill would cost approximately $700 million. Voest has stated that they might arrange through equipment supplier and Austrian government financing up to $500 million of the total, and further agree to market the semi-finished steel in Europe to repay these loans. This now puts the project within the reach of Liberia.

The balance of the $200 million required for the project might be financed up to 100% from international sources by disassembling from the project the infrastructure costs involved, including the port and loading facilities, the 100-MW steam electric generating station and transmission system tied to the national grid to Monrovia, a new city to house three thousand families, utilities, roads and industrial water supply. All of these services would be paid for by the steel mill in rents, fees and tariffs

in foreign exchange. This would enable the repayment of long-term international loans without adding a significant additional burden to the Liberian Government's Balance of Payments, or foreign borrowing capability.

Mano River Union Support for Liberia's Iron and Steel Project

The 1967 W. S. Atkins study estimated a 1985 market for small structural steel shapes in Liberia of 48,000 tons and a similar market in Sierra Leone. This market now appears optimistic in the light of the current economics. In any event, the Union market is adequate to support only a fraction of the structural mills' capacity. However, the project may be more attractive to international financing sources if it is developed with the joint international support of the two countries exerted through the aegis of the Mano River Union. Furthermore, there are now higher price levels and new marketing opportunities for small structural shapes and galvanized roofing corrugated sheet in West Africa following the failure of the European steel makers to meet market requirements in 1973-74. This new situation contributes to the project's economic attractiveness.

Voest is not the only steel maker to look to the raw material source for locating new steel-making capacity. Kaiser, Bethlehem Steel and US steel all abandoned plans for major new integrated iron and steel plants on the U. S. West Coast in 1970. One alternative was a major new semi-finished steel-producing project in Australia supplying up to 10 million tons of ingot to U. S. and Japanese rolling mills.

It would appear that the time has come for Liberia to initiate this trend in Africa. When proven in Liberia semi-finished steel mills might be realized at a number of other African iron-ore exporting ports in the future. Direct-reduction technology would be appropriate only where natural gas is available. This is the case in Gabon, for the Belinga iron ore project, which could economically export a large portion of prereduced metallized iron pellets. Electric steel-making facilities utilizing these pellets can be economically located in a number of African countries which have both cheap hydro-electric energy and an adequate market.

In a 1.5 million ton Liberian steel mill some 3,500 workers would be employed, along with 800 managerial and engineering staff. Imported raw material costs, including coke and limestone, are estimated at $120 million, and the annual sales volume is estimated at $675 million at current market prices.

TABLE VIII-1

IRON & STEEL IMPORTS LIBERIA & SIERRA LEONE
1970, 1972, 1974 and PROJECTIONS FOR 1980-85

Country & Product	Imports, (000) Metric Tons					1974 Value of Imports, Le or $	
				Projections			
	1970	1972	1974	1980	1985	Total (000)	Per Ton
LIBERIA							
Total Iron & Steel Products	18.7	15.4	16.2	25.0	40.0	8,006	493.00
SIERRA LEONE							
Total Iron & Steel Products	23.2	13.0	14.5	30.0	50.0	6,341	438.00
Total Union Market	41.9	28.4	30.7	55.0	90.0		

Source: Annual Trade Statistics & Sierra Leone & Liberia

ALUMINA PLANT - SIERRA LEONE

Economic Analysis of the Existing Alumina Project

Sierra Leone has the opportunity today to gain a major high value export industry, if she can encourage Alusuisse to undertake an alumina project at Pepel. This would involve a major investment of some $400 million for the minimum economic size plant today of some 600,000 tons annual capacity. The value of export sales at $165.00 per ton would be approximately $100 million. Value of imported raw materials, oil and caustic soda is $20 million.

Alusuisse has been engaged in mining bauxite in Sierra Leone for over a decade, exporting out approximately seven hundred thousand tons per year. They have explored bauxite deposits in the North West of the country extending in a strip, north of Freetown to the Guinea Border approximately 50 miles inland from the sea.

It is reported that Alusuisse has drilled and proven over one hundred million tons of 48% alumina, 4% silica bauxite, adequate to feed a major alumina refinery. The indicated reserves are a multiple of the proven reserves. The bauxite deposits straddle the existing railway midway between the iron ore port of Pepel and the iron ore mines at Marampa.

The existence of the port, railway, housing and other infrastructure of the recently shut-down Delco Iron Mine which was shipping 2 million tons per year provides a significant economic advantage to the proposed alumina plant at the port and would not preclude the use of the railway for iron ore when the project is resurrected as a pelletized ore project.

Alusuisse is interested in building more alumina capacity because they have recently taken over the proposed Inga aluminum smelter project in Zaire at the mouth of the Zaire River. Alusuisse's existing worldwide alumina plant capacity of approximately two million tons is already committed to its holdings of approximately one million tons in aluminum smelting capacity concentrated in Europe, U. S. A. and South Africa.

Alusuisse's largest alumina plant is located at Gove, North Australia, with 1.1 million tons annual capacity. This plant based upon large bauxite reserves may be expanded if Alusuisse obtains a supply contract for any of the six new aluminum smelters planned by the Arab countries along the Persian Gulf. It is not as economically attractive to supply the Inga smelter from Australia, because of the long shipping distance.

Alusuisse also is in partnership with the Guinea Government in developing a new bauxite mine based upon Guinea's large high grade bauxite reserves near the existing railway from Conakry to Fria. Alusuisse was intending until 1973 to build its next alumina plant at Ludwigshaven, Germany with German subsidized capital and fed by Guinea bauxite. Alusuisse is also considering an alumina project in Guinea which could be financed by the Arabs who have offered the Guinea Government financing for 2.0 million tons of alumina plant capacity. The Sierra Leone alumina project thus faces difficult competition.

The alumina project planned by the Guinea Government is to be located at the Boké port where existing bauxite exports are approaching 9.0 million tons per annum. The Guinea Government owns the docks, railway and other infrastructure 100% as a result of the $315 million financing package arranged with the World Bank during the construction of the Boke project. Thus, Guinea, in addition to Arab capital, also has the economic advantage of being able to use the existing infrastructure to locate a major alumina project. The plant would be supplied by expanding bauxite production. Halco, the consortium of major aluminum companies who developed the Boké project in 50-50 partnership with the Guinea Government, have a contractual obligation to construct an alumina plant by 1977 and thus might sponsor the Arab financed project. Halco is owned by Alcoa (26%), Alcan (26%), Martin Marietta (20%), VAM (9%) and Metalgesellschaft (9%).

Alusuisse might alternatively be prepared to undertake another alumina plant near Conakry based upon bringing bauxite down by the existing railway from its new bauxite mine at Tougue near Guinea's existing alumina plant at Fria (Alusuisse is a 10% owner of the Fria consortium).

The replacement value of Alusuisse's existing 1.0 million tons of smelter capacity, 2.0 million tons of alumina capacity and 1.0 million tons of rolling and extrusion plant would exceed $2.0 billion. However, as with the other major aluminum companies, the current economic recession has forced production cutbacks and virtually eliminated profits this past year. As a result Alusuisse can only undertake a major new project in a financing package which is close to 100% externally financed.

Alusuisse's interest in minimizing the equity capital requirement in the Sierra Leone alumina project is also attractive to the Sierra Leone Government which like Alusuisse has virtually no capital available for such a project unless they could attract the assistance of Arab capital.

There are numbers of ways to increase the proportion of financing on the alumina project. One is by disassembling from the project all infrastructure requirements, including the required new 50-MW steam electric generating station and transmission facilities, the additional port and dock facilities including alumina storage and loading conveyors and new housing and water supply and railway rolling stock requirements. These infrastructure packages might total $100 million of the $400 million total project capital cost and would be capable of financing up to 100% from international lending agencies as Government supplied services to the alumina project. They would place no net foreign exchange or financing burden on the Government's existing external debt structure because they would be entirely self-liquidating from the foreign exchange revenues earned from the alumina exports.

Alusuisse would still remain the overall project manager and engineer for not only the alumina plant but all of the infrastructure above. The disassembling of the infrastructure would be for financing and bidding purposes only.

Alusuisse would attempt to obtain loans for as large a proportion as possible of the remaining $300 million alumina plant and mine cost from equipment and service supplier financing packages. If they are able to finance 80%, this would leave $60 million equity capital requirement. They would then attempt to supply as much as $30 million of this requirement as the cost of their future profits for the supply of know-how, engineering and management services for the project.

If the Sierra Leone Government were to request up to a 50% future participation in the equity of the project, and still minimize their cash input, they might be able to provide part of this equity in the form of existing infrastructure, land and the capitalized value of future bauxite mineral royalties. For example, if a royalty level of $1 per ton of bauxite were established, this would generate future revenues of approximately $1.5 million per year which could be capitalized to provide possibly $15 million of equity participation.

The world price of alumina has increased rapidly in the last four years from as low as $65 per ton in 1970-71 to some $165 per ton today on long term contracts supplied by the only two companies in the world having surplus alumina available for sale, Kaiser and Alcoa. This price level has been pushed up by rising material costs including a quadrupling of fuel oil and caustic soda prices, and by a virtual doubling of the capital cost of constructing new alumina plants during this same period.

While a new alumina project in Sierra Leone will be profitable, it will not generate a significant cash flow during its first years of operation because of the high capital repayment requirements on the 90% plus financed package. Accelerated depreciation allowances during the first 5 years of operation will eliminate taxes and facilitate loan repayments.

There are many economic benefits to Sierra Leone which will be realized from the early years of the project even if tax revenues and profit returns will be delayed until after the 5th year of operation period. These benefits include the provision of upwards of 2000 new jobs at Pepel and at the mine site along with new jobs for twice that number in service industry to service this project workforce.

Another benefit will be derived from the new large-scale steam electric generating station which will be tied to Freetown's electrical system and lower electric generating costs significantly. It will also provide the basis for later proceeding with the larger 80-MW Bambuna hydroelectric project. In this regard, however, it must be stated that Sierra Leone does not have a large enough supply of low cost hydroelectric energy to justify the construction of a modern economic size aluminum smelting industry. Such a smelter as was constructed in Ghana consumes 440 MW of electricity to produce 220 thousand tons of aluminum metal annually. It would require five Bambuna projects to supply this power requirement (Ghana's Akosombo Dam is a 1,000 MW dam).

It may also be noted that the $400 million which would be spent on the Sierra Leone alumina project is capital which has to be raised by the aluminum industry for a new

alumina project somewhere in the world and supplements capital which would otherwise come to Sierra Leone and in no way diminishes Sierra Leone's future borrowing ability.

Possible Sponsors of an Alumina Plant in Sierra Leone

It is of interest to the Sierra Leone government to review the possibility of obtaining other sponsors for the project in the event that Alusuisse does not decide to go ahead in the light of their other opportunities. As noted above Alusuisse has existing alumina plant holdings in Australia and Guinea, both with large bauxite reserves to support new alumina capacity and both countries are offering attractions to create new alumina plants, rather than export bauxite.

However, the major aluminum companies and smelter owners now believe it advantageous to sacrifice economies of scale and diversify their alumina supply sources as much as possible and this should increase the possibility of obtaining sponsors for Sierra Leone's industry, and for other similar competing projects based upon proven, but generally smaller, bauxite deposits in Ghana (Kaiser and Ardeco-Japanese sponsors), Malagasy (Pechiney) and Malawi (Lonroho with South African market and financial interest).

The possible alternative sponsors of the Sierra Leone alumina project, apart from the big six aluminum companies (who seldom take up projects dropped by their competitors), are those countries undertaking new smelter projects and a few small independent aluminum smelter owners, such as Southwire or Alnor (Norway).

Most of the alumina projects in recent years such as Gladstone Australia or Alpart Jamaica, have been developed as joint ventures. The exceptions are those undertaken by Alcan and Alcoa. The reasons are that the alumina projects are larger than any single new smelter requirements, and the smaller aluminum smelter owner does not like to be entirely dependent upon a single alumina supply. The minimum economic size alumina plant for Sierra Leone at 600,000 tons annual capacity will provide alumina adequate for two major new aluminum smelters of 150,000 tons capacity each, such as those now planned by Iraq, Saudi Arabia, Algeria, Abu Dhabi, Qatar, or Iran.

Each of the Arab countries planning smelters must acquire long term (10-year) supply contracts for alumina from an existing alumina producer capable of expanding output, or sponsor a new project. The major alumina sources today are Kaiser and Alcoa. A number of the Arab countries have signed an agreement with the Guinea government to sponsor a new 2 million ton alumina plant in Guinea based upon Boké bauxite. However, some of these countries may find it advantageous to sponsor other projects in independent countries such as Sierra Leone.

Iraq or Algeria might be a possible sponsor of the Sierra Leone alumina project. They both plan 150,000 ton state-owned smelters and have asked Kaiser Engineers,[1] among others, to submit fixed-priced turn-key packages for design, construction and management of them, but not requiring equity participation.

The Soviet Union is also a major importer of alumina, largely from Kaiser, and has a tremendous new 6 million ton requirement to feed 3 million tons of smelters planned for Siberia. Pechiney has agreed, and Kaiser is proposing, to construct both the smelters and alumina plants in the USSR - with Western financing to be repaid in aluminum metal over 15 years. The alumina plants in the Soviet Union are high-cost operations based upon poor bauxite. The Soviets have imported alumina in the past (at prices below their own cost of production) for a small proportion of their requirements. They might be a possible source of capital for a portion of a Sierra Leone alumina project to be repaid from the project's alumina output. This might be made attractive to them if the project were developed in conjunction with one of their existing trading partners such as Iraq or Algeria taking the other half of the alumina for their planned smelters. However, as the Soviets have not sponsored such a project before, this must be considered a long shot.

Alternative Sierra Leone Alumina Project Development Program in the Event of Failure of Alusuisse Sponsorship

Alusuisse's feasibility study for the project will be made available to the Government with the geological reports and mining program for the bauxite deposit. They will also have an outline plant layout, and estimates of construction and operating costs. Alusuisse would expect to be reimbursed for their direct geological investigation costs incurred, if any other consortium takes over the project.

The next task is to present the project to those countries and groups requiring alumina with the goal to arrange a consortium of two or three compatible sponsors whose long term contracts for the alumina and/or investment interest in the project will facilitate the financing of the project.

The selling task above requires top Ministerial leadership on the Government side of a task force backed by technically competent advisors, including engineering and economic talent. An engineering firm, such as Kaiser Engineers, or independent consultants could provide the technical back-up. Their services might be made available at cost during the proposal and promotion phase in anticipation of the engineering and management contract.

[1] A note on the Kaiser: The Iraq, Algeria and Soviet interest in building new smelters and obtaining new alumina supplies had led them to Kaiser Engineers who have placed proposals with all three countries to construct their smelters, and in addition for the Soviets, their alumina plants. Kaiser has more advanced alumina technology and lower-cost engineering services compared to other aluminum suppliers. Kaiser was successful in obtaining finance for, and constructed the only heavy industry built in independent Black Africa - the 220,000 ton aluminum smelter in Ghana; and was able to obtain independent finance for the $100-million Bandama Hydroelectric Project in the Ivory Coast in the face or World Bank rejection and opposition.

PAPER PULP AND PLYWOOD INDUSTRIES (BOTH COUNTRIES)

Both Liberia and Sierra Leone have significant stands of tropical hardwood forests which are being cut for the domestic sawn timber or lumber market, and increasingly for export as logs and sawn timber. In Liberia a law restricting export of logs has yet to be enforced and in Sierra Leone log exports are now starting.

Liberia's remaining forest reserves are larger than Sierra Leone's and foreign capital has entered the market to conduct logging operations for export and to construct a major $30 million plywood mill (Vanply) employing some 1200 workers which commenced production in early 1976.

Very little has been done in either country to reforest the cutover areas, although a small planting program is underway in Sierra Leone. Cutting for export timber is generally "selective" as a large proportion of the forest is not commercially suitable. Export logging is in reality a one-time "mining" of the hardwood trees in these tropical rain forests as the valuable trees do not come back. The countries should attempt to realize the highest value added from the exploitation of their forest resources limiting their use to domestic wood processing industries, which can pay for reforestation.

An alternative logging system involves clear-cutting the entire forest, followed by replanting with fast-growing softwoods such as the indigenous Gmelina, or with pine. The system can be economic if there is a commercial use for the large proportion of the hardwood forest which is unsuitable for lumber. In the Ivory Coast, the government has attempted to combine the timber logging and sawmill exploitation permits with the requirement to clear-cut the forest, and supply the non-commercial timber to a hardwood pulp mill. The soft wood plantations will sustain the pulp mill when the hardwood forest is gone.

The capital costs of hardwood pulp mills are not significantly greater than softwood, but there are not many in operation yet in the tropics. Gabon has announced a 250,000 ton hardwood pulping plant with Swedish assistance, and projects are proposed in Angola and Ivory Coast.

Domestic Markets for Lumber, Plywood and Particle Board

The imports of sawn timber, primarily seasoned construction grade softwoods, plywood and particle board are shown in Table VIII-2. As there is no domestic production of plywood or particle board in either country today, the imports represent the market for these products. However, the sawn timber imports represent only a small fraction (5-10%) of the timber utilized in local construction which is supplied primarily by domestic sawmills as unseasoned hardwood of varying quality. The price for domestic sawn unseasoned hardwood in either country ranges from $3.50 to $4.00 per ft^3; the imported softwoods utilized only for high-quality construction cost from $7.50 to $10.00.

Status of the Sawn Timber Industry

Wood building construction has a long history in Sierra Leone, where wood construction is more utilized than in Liberia. The Sierra Leone sawmill industry has developed to supply almost the entire market. About half of Sierra Leone's supply is produced by the Government's Forest Industries Corporation sawmill at Kenema as may be seen in Table VIII-2.

TABLE VIII-2

SIERRA LEONE LUMBER PRODUCTION AND IMPORTS, 1975

Sawmill or Source	Estimated Volume/annum, ft^3
Forest Industries Corporation, Kenema	400,000
Panguma Sawmill	180,000
Kasewa Sawmill	20,000
Some 100 Hand-Pit Sawyers	300,000
Total Domestic Production	900,000
Imports (Kiln Dried Softwoods)	57,000
Total Sawn Timber Consumption	957,000

During 1974-75 the Forest Industries Corporation aided by a bilateral United Kingdom technical assistance program doubled its capacity, installing new saw, logging equipment and two new drying kilns. The additional production capability now allows the building up of the three-month inventory required for satisfactory air drying of the timber. The Forest Industries Corporation was also able to commence exports of sawn timber in the fall of 1975.

In 1975 an Italian firm was also licensed to start exporting logs and after two years a proportion of sawn timber, from a 75,000 acre tract of the Gola forest South East of Kenema along the Mano River. Thirty logging contractors shipped 185,000 tons of logs out of Liberia in 1974, with a total value of $17.6 million; sawn timber exports were negligible.

Plywood Market and Industry

In 1974 Liberia and Sierra Leone each imported about 30,000 cwt of plywood (equivalent to 85,000 ft^3 of sawn timber). These imports cost each country approximately $800,000 in 1974. Most of the supply came from mills in Ghana, Ivory Coast and

Gabon. Table VIII-3 presents Liberia and Sierra Leone wood product imports and projections to 1985.

In Eastern Liberia Vanply has constructed a new plywood mill which will start production in 1976 and will turn Liberia into a net exporter, with marketing opportunities in Sierra Leone.

Wood Industry Studies for the Exploitation of the Gola Forests

A study on the Sierra Leone timber industry and the Liberian and Sierra Leone wood research efforts was prepared for the Mano River Union in September 1974 by an FAO consultant, Mr. Abel Comben (Ref. FAO Report WS/F 78.6, 1975). The report included recommendations for new wood industries based on Sierra Leone's Gola forests near the Mano River.

A month earlier another FAO forestry expert from the ECA, Mr. K.R. Meyer, undertook a study for the Mano River Union of the wood industry possibilities on both sides of the river (Ref. UNECA Report M74-1944, 9/74). He prepared Terms of Reference for a number of pre-feasibility studies of recommended projects in both countries. He did not discuss the possible integration of the sawmill, plywood and pulp and paper projects because his suggested pulp mill projects were to be softwood based and therefore await the creation of forest plantations of from 50,000 to 300,000 acres.

FAO Recommendations for Paper Pulp Studies

Mr. Meyer proposed two separate pulp projects, one a 200-300,000 ton/year paper pulp export project on the Liberian side near Bomi Hills. This project would be advantaged by location with access to the existing iron ore railway to Monrovia.

A typical project employing 2,000 workers might cost $100 million; and realize annual export sales of $100 million, importing $20 million in fuel and raw materials to produce 150,000 tons pulp annually.

The second project suggested for Sierra Leone was a smaller 50,000 ton per year combined pulp and paper mill directed toward the Union Market. However, the Union combined paper market is only a fraction of this output. In 1974, the paper product imports totaled 3,700 tons in Sierra Leone and 3,600 tons in Liberia. The smaller scale of the Sierra Leone project also reflect his judgement that only 50,000 acres could be made available for softwood plantation. A paper project aimed at the Union market is marginal unless attached to a pulp export mill.

There apparently were larger hardwood forest areas available in Sierra Leone as evidenced by the 75,000 acre Italian logging concession granted subsequently in 1975.

Liberia has received proposals from Swedish and Finnish firms interested in undertaking hardwood paper pulp projects. Whether these proposals carry with them the required

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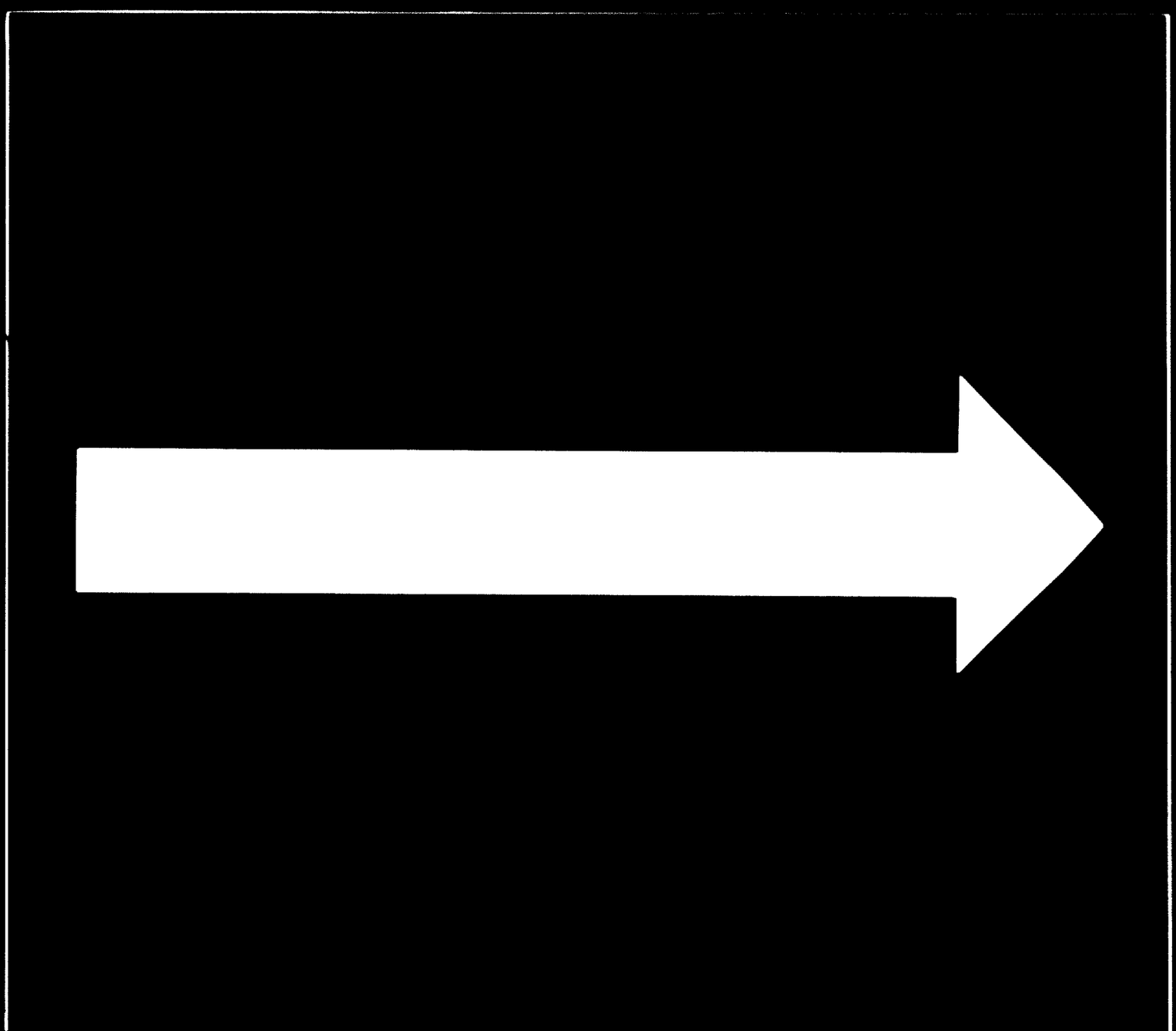

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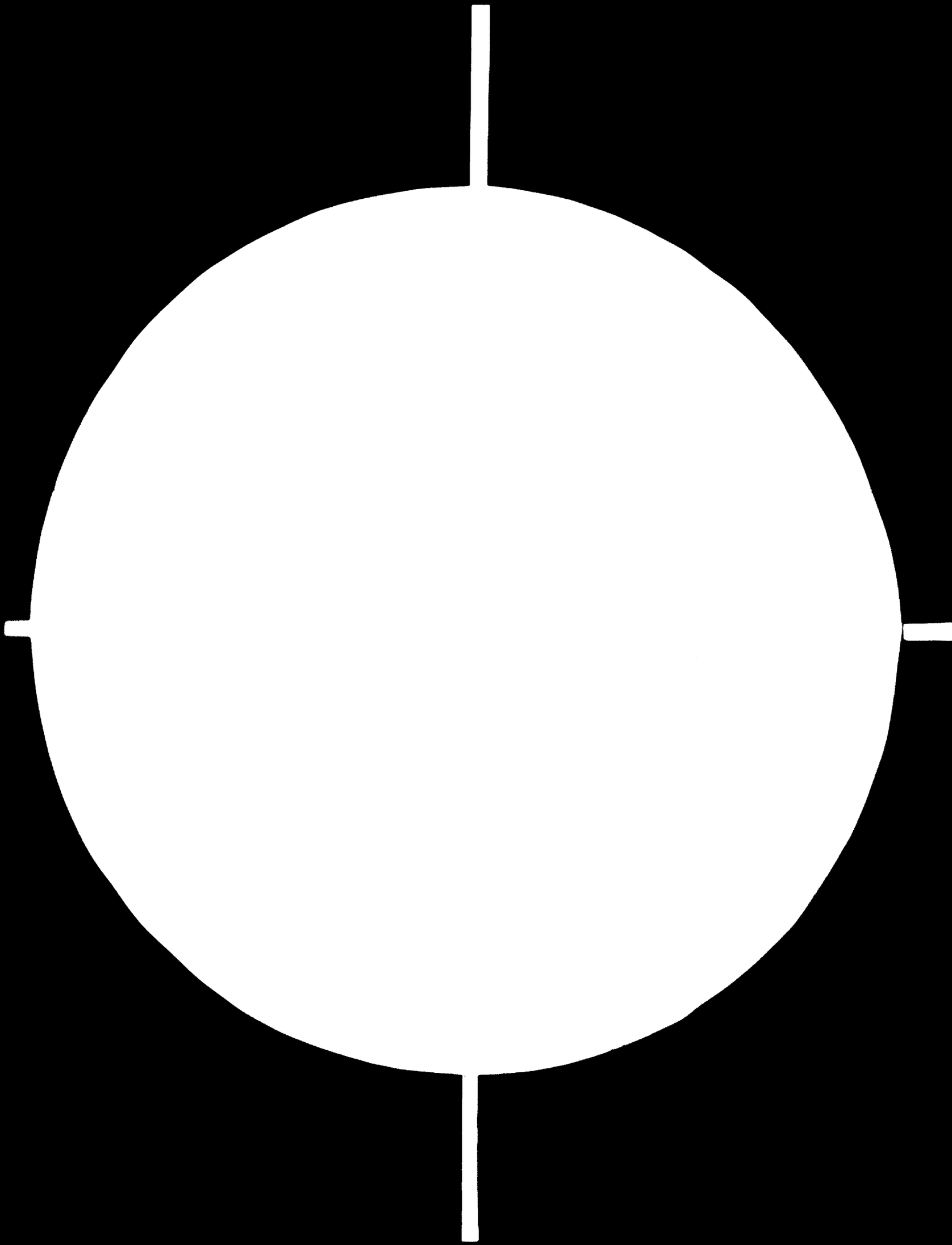

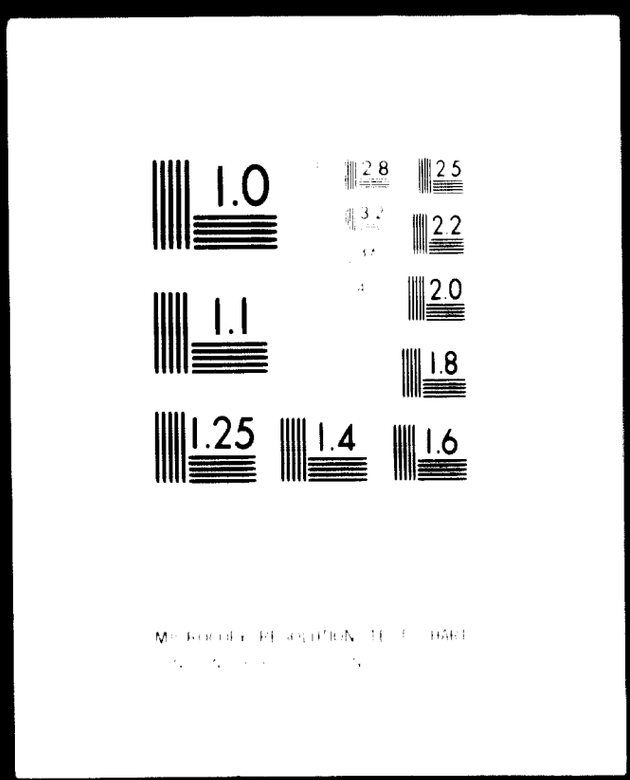

large-scale financial commitments and whether the Government is prepared to participate constructively is not known.

FAO Recommendations for Plywood Industry Studies

Sierra Leone's sawmill industry has increased its capacity and to a lesser extent the quality of its product to supply the entire domestic lumber market, but there has been no follow up on the recommendation made in 1970 by FAO Experts Doffine and Walsh to develop a veneer and plywood mill (Ref. Report RA 2742, FAO, 1970). Mr. Comben endorsed this recommendation in his September 1974 Report to the Mano River Union noting the rising cost of plywood imports into Sierra Leone. However, Mr. Meyer recommended that his plywood mill project be located at Bomi Hills, Liberia.

A typical project similar to Vanply's would cost $30 million, employ 1200 workers and generate export sales of $20 million. Imported fuel, spares, and raw materials might total $7 million.

Rumanian Feasibility Studies for Exploitation of the Gola Forests in Sierra Leone and Liberia

The 1975 Rumanian feasibility study undertaken for the Sierra Leone Government recommends further expansion of the Forest Industries Corporation Kenema mill, and the construction of another major sawmill in the Tonkolili forest. Both of these projects would aim at the export market as the country's sawmill capacity has surpassed domestic requirements. A considerable investment is required and the Rumanians have offered only partial financing. The government does not appear able to participate financially at this time.

In Liberia, the Rumanians have recommended construction of a major new sawmill to exploit the Gola forests East of the Mano River but again have offered only partial financing.

It is not known if either government is willing to share to any substantial extent in the recommended investments. Liberian Private investors have not shown much interest in undertaking such large-scale industrial investments in the past. Their domestic sawmill industry has been developed by small entrepreneurs.

The multitude of duplicating costly studies involves a serious economic waste of resources if no investment is likely to be generated by them. The fact that these studies are provided by the UN and many countries as gifts with little coordination may contribute to the casual way in which they are solicited for and are received in the two countries.

Recommended Mano River Pulp and Paper, and Plywood Industry Studies

The pulp projects recommended by Mr. Meyer would require from $60 to $250 million investment and should only be the subject of pre-feasibility studies conducted by firms capable of attracting this kind of foreign capital and management to develop the projects.

TABLE VIII-3

LIBERIA AND SIERRA LEONE WOOD PRODUCT IMPORTS
1970, 1974, AND 1980-85 PROJECTIONS

Product and Country	Volume of Imports				Value of Imports, 000 $ or Leones		1974 Unit Value, $ or Le
			Projections				
	1970	1974	1980	1985	1970*	1974	
Sierra Leone							
Sawn Timber (ft^3)	63,000	57,000	10,000**	12,000	Le 112	Le 384	Le 6.74
Plywood (cwts)	25,000	28,000	35,000	45,000	303	795	28.40
Particle Board (cwts)	3,600	2,600	2,000	2,500	28	44	16.92
					Le 443	Le 1,223	
Liberia							
Sawn Timber (ft^3)	25,000	7,000**	8,000	10,000	$ 122	$ 43	$ 6.14
Plywood (cwts)	19,600	29,000	5,000**	8,000	566	850	29.31
Particle Board (cwts)	1,220	2,600	2,000	2,500	65	128	48.46
					$ 753	$1,021	

*1972 Liberia
**Imports displaced by domestic production

Source: Annual Trade Statistics, Sierra Leone and Liberia

The two pre-feasibility studies recommended by Mr. Meyer for the Mano River Area should be assigned to one firm experienced in hardwood pulp technology and respected by potential investors. Whether there are two possible projects, or one, should be determined by the study.

The recommended pre-feasibility studies for plywood mills at both locations, Kenema and Bomi Hills, should be undertaken by the same firm in conjunction with the paper pulp study. This industry is economically attractive today and might attract the kind of foreign capital and management required. It may be possible to realize economics by combining the plywood and pulp projects. It would appear difficult to make a case for Sierra Leone to joint venture a second plywood mill in Liberia as a Union industry before they had undertaken their own long delayed project unless a competent study indicates inadequate forest reserves.

Both Governments have sawmill projects underway and feasibility studies undertaken adequate to not only satisfy their own future domestic requirements, but to significantly expand their exports, if they can find financing. Additional sawmill feasibility studies should be only undertaken by potential investors. The log exporters should be held to their agreements to convert to sawn timber exports, or cease operation.

The Canadian government has reportedly offered to the Mano River Union to undertake feasibility studies for the pulp and paper and plywood projects. This may be attractive as the Canadians are experienced in the pulp and paper industry, but the firm selected should have available expertise on the hardwood pulp industry.

Pulp, Paper and Plywood Projects Pre-Feasibility Terms of Reference

The following proposed projects in the Gola forests should be analyzed based on available information and pre-feasibility studies prepared for those considered feasible.

a) A 50,000 ton export pulp and 10,000 ton domestic paper mill in Sierra Leone aimed at satisfying the Mano River Union domestic paper demand and exporting the remaining pulp.

b) A major Liberian pulp mill for the world market (this project could alternatively include the small domestic paper mill).

c) A plywood mill at Kenema or near the Sierra Leone pulp mill.

d) A plywood mill near the Liberian pulp mill or at Bomi Hills.

These studies would adhere to the following Terms of Reference providing:

1. A concise statement or explanation of the conceptual content of the project, including a definitive analysis of the available forest resources and concession costs.

2. A description of the process and outline design of the plant and basic equipment layout.

3. A primary site recommendation along with description of the support infrastructure including roads, railroads, housing, ports and power supplies. Alternate sites, with supporting data should be described and the site selection economic analysis should be effectively presented.

4. Substantially detailed information on wood sources, logging and transportation costs, species distribution and associated information.

5. Reliable information on the cost and availability of other materials, especially chlorine and caustic.

6. Product mix and volume for at least the first ten years and their relationship to existing and projected markets and price structures.

7. For the pulp projects particularly, reliable data on water quality and supply and effluent disposal capabilities.

8. Labor requirements and availability, training and plans.

9. Management requirements, both foreign and national, along with plans for training of national management.

10. Investment including working capital in foreign and domestic currencies (all cost estimates must be competent pre-feasibility level estimates).

11. Start up, operating, operating, sales and shipping costs.

12. Sales revenue estimates.

13. Twenty-year projections of cash flow, profitability and discounted rate of return on investment.

Recommended Study Team

These studies should be undertaken by a single appropriately experienced firm because of the resulting economies. The following Study Team manpower estimates are based on the simultaneous development of data for all four projects:

Discipline	Weeks in MRU
Industrial Pulp Engineer/Economist (Project Manager)	9-10
Forester	8-9
Plywood engineer	4-5
Paper Engineer	4-5

SECTION IX

ANALYSIS OF INDUSTRIES NOT RECOMMENDED FOR UNION INDUSTRY STATUS AT THIS TIME

The following industries are analyzed in this Section:

1. Cement
2. Fertilizers
3. Fruit, Vegetable Canning
4. Edible Oil Seed Crushing
5. Sugar
6. Cassava Pellets
7. Fiber Bags or Sacks
8. Aluminum Domestic Utensils

CEMENT INDUSTRY

Economics of Industry Establishment

Along the Coast of West Africa, limestone deposits exist only in Nigeria, Dahomey, Togo and Ghana, Guinea and Senegal. They have provided the basis of the large cement industry in Senegal and Nigeria, and now long delayed projects are underway in the other countries. The geology of Ivory Coast, Liberia and Sierra Leone does not provide limestone. As the cement industry requires almost an equal volume of limestone to the weight of cement produced, the only economic cement plants are located on limestone deposits and it is not deemed an economic industry in Sierra Leone or Liberia (although Industry Planning Advisers in Liberia had recommended it).

For these countries without limestone, the alternative to importing sacked cement with its high shipping, hauling, sack breakage and quality deterioration costs has been the establishment of clinker grinding plants at Monrovia and Sierra Leone. These plants find their economic justification in their ability to import cement clinker in bulk for grinding and sacking in the market center (Clinker is the fired cement product of the kiln and not subject to moisture deterioration in bulk shipping). A number of countries offer highly competitive prices, and clinker is more readily available even during periods of cement shortage such as were experienced world-wide during 1973-74.

The production cost of cement manufacture was pushed up sharply by the quadrupling of the price of residual fuel oil in 1974 (wet process plants consume up to 1/3 ton of oil, or equivalent volume of gas, per ton of cement). Clinker prices have almost doubled from $18-$20 per ton to $34 per ton, f.o.b. export ports in Europe.

The Sierra Leone and Liberia clinker grinding plants were established in the late 1960's. The plant in Liberia continues to operate, however, the plant in Freetown was shut down in 1968 following the departure of the Israeli managing staff who had established the plant and operated it from 1966 to 1968, when they were replaced by local staff. It appears that the reasons for closure of the plant lay in incompetent management which led to bankruptcy rather than in any technical or economic inadequacy of the plant.

We examined the Sierra Leone defunct plant and found that only its warehouse was being utilized (to store sack cement by the country's major importer). The machinery including the ball grinding mills, electric motors, conveyors, and electrical switch gear appear to be mostly restorable. The plant has two basic inadequacies which can be corrected. First, there is not a silo for storing ground cement and therefore the sacking plant must operate whenever the ball mill is operating. This means both that the entire plant has to shut down when either operation is in trouble and that packaging slows production in the ball mill. It also does not allow the marketing of bulk cement in large construction jobs and to ready-mix plants (however, it was noted that the clinker plant in Monrovia, which has a monopoly on cement supply and does have

adequate cement storage, does not bother to offer price concessions, or market bulk cement even to the Monrovia ready-mix plant). This disability in the Sierra Leone plant could be corrected by constructing a silo to the rear of the ball mill house.

The second disability of the Sierra Leone plant is the necessity to unload clinker from ships to barges for shuttle to the clinker plants unloading dock where the unloading rate is slowed by an undersized dock crane with a small clamshell bucket. As a result, shipping costs were increased because the slow discharge rate from the ships required extended time in port for ships with even modest size clinker cargoes. This might be corrected by either dredging for larger ship access to the plant, or by acquiring a couple of larger used barges which would provide adequate storage to allow more rapid ship unloading, and increasing the capacity of the wharf crane (The clinker plant in Monrovia is not located adjacent to the port, but uses fleets of trucks to unload ships).

Market Analysis

Reflecting the economic stagnation, the market for cement in Sierra Leone has not shown much expansion since 1970 at around 64,000 tons per year. In Liberia cement consumption rose to 49,200 tons in 1974. The volume of cement imported and cost per ton c. i. f. for 1970 and 1974 are presented in Table IX-1.

It is interesting to note in Table IX-1 that Liberia paid more for a ton of bulk clinker in 1974 than Sierra Leone paid for sacked cement; $47.72 versus Le34.81.

The Fall, 1975 price of cement in Monrovia (which included a 6% excise tax) was $3.10 per 100 lb. sack, or $68 per ton. This price is high compared to the current c. i. f. price of approximately $45 per ton. Prices have declined in the second half of 1975 from the shortage inspired higher levels reached in late 1974. The price of cement in Sierra Leone also appears to involve a substantial mark-up from the c. i. f. landed price today and was selling for Le3.00 per sack in 1975.

In both countries the Government has allowed relatively high prices for cement to be maintained by creating monopoly supply conditions. In Sierra Leone the Government allows cement to be imported only with the granting of import licenses. The licenses place the marketing of cement in a few hands and as a result sellers were able to realize retail prices as high as Le66 per ton by the end of 1974, involving a profitable mark-up from the average c. i. f. cost of sack cement of Le34.81 per ton in 1974.

Current Cement Project Proposals for Sierra Leone

There have been other proposals including one to allow marketing from the clinker plant in Monrovia in Sierra Leone and another to construct a new clinker grinding plant in Freetown. Neither of these proposals appear to be economically attractive. First the distance from Monrovia to Freetown over the new bridge will still be over 300 miles which, with road transport costs at approximately 7¢ per ton mile, would add $21 to the cost of sacked cement delivered to Freetown from Monrovia. The

other proposal to construct a new clinker grinding plant at a cost of some $2 million appears an economic waste of capital. The practical alternative is for Freetown to resurrect its own clinker grinding plant and not pay any premium for overland transportation to the market.

It thus appears that both countries have an opportunity to rationalize their national cement supplies and lower costs. Moreover, classification of the industry as a Union Industry would not offer any significant economic advantage over the status as a national industry once monopoly pricing practices are regulated. The essential program of each country should be to minimize cement costs to encourage construction activity by eliminating monopoly pricing whether the monopoly is granted to a clinker grinding industry, which should realize adequate economic returns without protection, or, as in Sierra Leone, granted to a favored few licensed importers.

Proposals for Mano River Union Co-operation with Other West African Cement Producers

There are, however, future possibilities for Liberia and Sierra Leone to cooperate with their neighboring West African countries in developing West African self-sufficiency in cement production. One opportunity is to cooperate with Guinea in the installment of a large economic size cement plant of 300,000 tons capacity (two kilns) at the proven large limestone deposit located at Siguiri on the Niger River, approximately 100 miles North of railhead at Kankan. The extension of railway to the cement plant has already been engineered by the Chinese as part of the planned railway intertie to Bamako. However, unless the railway is brough South from Kankan to Nimba it would appear that road transport costs for cement clinker delivery to Liberia or Sierra Leone would be prohibitive.

The second more likely possibility is for the two countries to joint venture finance an economical additional kiln expansion at the Senegal cement plant to supply clinker to the Monrovia and Freetown clinker grinding plants. Ivory Coast has recently successfully created a new cement plant in Togo as a multinational joint venture to supply not only its clinker requirements, but those of Ghana also.

It is recommended that the Mano River Union field a cement expert for a few weeks to visit Senegal and Guinea and prepare an economic evaluation of these possible sources of clinker. However, a Sierra Leone entrepreneur may already be investigating this possibility.

TABLE IX-1

LIBERIA AND SIERRA LEONE CEMENT IMPORTS,
1970, 1974, AND 1980-85 PROJECTIONS

Country and Product	Imports, 000 Metric Tons				1974 Value of Imports	
			Projections			
LIBERIA	1970	1974	1980	1985	Total, 000 Le, or $	Per Ton, Le or $
Cement (Clinker)	19.8	48.0			2,288	$47.72
Cement (Sacked)	___	1.2	___	___	139	$116.00
Total	19.8	49.2	60.0	80.0	2,427	
SIERRA LEONE						
Cement (Sacked)	62.6	63.5	72.0	95.0	2,211	Le34.81
TOTAL UNION MARKET	82.4	112.7	130.0	175.0		

Source: Annual Trade Statistics Sierra Leone and Liberia

FERTILIZER INDUSTRY

Economics of Industry Location

Ammonia - Nitrogen Phosphate Industries

Developing countries' needs for fertilizers have been growing rapidly in recent years with the rate of fertilizer growth about twice that of the developed countries. Fertilizer consumption in West Africa is estimated to grow at 12% annually for the period 1975-1980. The high rate of growth can be explained by the fact that West African countries have started from a very low base and are attempting self-sufficiency in food production to cut down on the foreign exchange costs of imported food.

As a result, a number of these countries have considered the construction of fertilizer plants both for nitrogen and phosphate fertilizers. These two nutrients (nitrogen and phosphorous) are most important in the growth of plant foods. Potassium is another important nutrient for balanced plant growth, but is generally found in some quantities in most African soils and is not needed as much as the other two nutrients.

In general nitrogen fertilizers, which are mostly manufactured from natural gas, are in greater demand for African soils, and applied in the form of urea, ammonium nitrate, ammonium sulphate or ammonium phosphate. Africa is the primary export source of phosphate rock in the world from Morocco and Togo. Phosphate fertilizers are being increasingly utilized and phosphate fertilizer plant capacity has been built in Africa, including Morocco, Senegal and Nigeria.

Nitrogen fertilizer plants are more prevalent because of the larger demand. For nitrogen fertilizer production liquid ammonia is generally imported from plant producing ammonia from natural gas, historically in the Southern USA and today from hew plants in oil and natural gas producing areas such as Trinidad and the Middle East. The most available forms of hydrocarbons come from natural gas, and from larger oil refineries tail gas, and naptha.

Raw Materials Availability and Previous Attempts to Develop the Industry

Sierra Leone and Liberia have no natural gas and adequate refinery tail gas to produce ammonia. However, it was proposed in 1973 prior to the rise in the price of oil, to construct an ammonia-urea plant in Sierra Leone mainly to supply the domestic market and to export to neighboring countries. The available fuel oil surplus from the Sierra Leone refinery, which was then exported at low prices, would be used in combination with imported naptha. The proposal was delivered in 1974, after the oil price rise, by N-Ren, International, a Belgian concern. Production of 58,000 tons of ammonia and 98,000 tons of urea was proposed, with two ammonia plants feeding one urea plant. The capital cost was estimated at $42 million. This was several times Sierra Leone's requirements but the demand for urea in West and Central Africa was estimated to be 570,000 tons in 1980.

At the time that the proposal was made, fertilizer demand had been out-stripping supply resulting in fertilizer price increases. These increases were further aggravated by higher transportation costs due to the oil crisis and the raw material price increases of hydrocarbons. Urea prices, as a result, increased five-fold between 1972 and 1974.

However, the proposal was based on the low fuel oil prices prevailing the previous year when fuel oil was still being dumped, and this plant would have then been marginally competitive with the European fertilizer complexes then exporting to African countries. However, as the international price of fuel oil increased fourfold in 1974 the plant would have faced severe competition from the existing and new export oriented ammonia-urea plants coming on stream in the Middle East which are based on low cost natural gas. Sufficient natural gas is flared in these areas to produce all the world's nitrogen fertilizers. These countries are producing 350,000-500,000 tons of ammonia annually in large capacity single stream plants equipped with centrifugal compressors, the latest ammonia technology. The cost of ammonia per ton is less than half that of small capacity ammonia plants, and only plants utilizing flared natural gas or refinery gases will survive in the future without protection.

The Government of Nigeria is building a $100 million ammonia-nitrogen fertilizer plant based on its flared natural gas producing up to 400,000 tons of ammonia per year, and over 1 million tons annually of urea, ammonium sulphates, and ammonium phosphates. The plant is designed to supply the West African and Central African markets.

Dye to the fact that fuel oil is no longer dumped and prices have risen in proportion to those of crude oil, the proposed Sierra Leone plant cannot be considered economic. In fact with improvements in anhydrous ammonia transportation, ammonia could be imported from Nigeria a good deal cheaper than it can be produced by a conventional small size ammonia plant.

NPK Satellite Plants and Mixing Plants

Another possibility mooted as a Mano River Union Industry is the construction of a granulation or mixing plant to supply NPK (complex fertilizers) or physically mixed fertilizers for the combined Liberia-Sierra Leone markets. No export potential to third countries could be envisaged because the low value added means that these plants are mainly designed to serve only regional areas. In general, developing countries with medium sized markets for fertilizers can import fertilizer intermediates such as ammonia or phosphoric acid to use in these satellite plants for the production of NP or NPK fertilizers. The adoption of satellite plants is indicated for countries having a market for nitrogen fertilizers from 20,000 to 100,000 tons of N per year, plus a market for phosphatic fertilizers from 10,000 to 80,000 tons of P_2O_5 per year.

Developing countries with markets for fertilizer that are smaller than the above are advised to continue to import finished fertilizers with possibly mixing operations for the production of NP or NPK fertilizers.

Market Analysis

The 1974 consumption of fertilizers in Sierra Leone and Liberia is indicated from the import statistics set forth in Table IX-2 and IX-3. The market projections for 1980 and 1985 are presented in Table IX-4.

TABLE IX-2

LIBERIAN FERTILIZER MARKET, 1974
(metric tons)

Product	Total Imports	Equivalent Nutrients	
		Tons of N	Tons of P_2O_5
ammonium calcium nitrates	32,218	6,443	-
ammonium sulphate	163	32	-
ammonium phosphate	3,618	578	1,736
urea	1,986	913	-
NPK	3,206	866	866
ammonia	1,938	1,589	-
Total	43,129	10,421	2,602

Source: Trade Statistics of Sierra Leone and Liberia

TABLE IX-3

SIERRA LEONE FERTILIZER MARKET, 1974
(metric tons)

Product	Total Imports	Equivalent Nutrients	
		Tons of N	Tons of P_2O_5
ammonium sulphate	100	20	-
ammonium phosphate	5,000	800	2,400
urea	200	92	-
NPK	1,500	405	405
Single superphosphate	400	-	88
ammonia	-	-	-
Total	7,200	1,317	2,893

Source: Trade Statistics of Sierra Leone and Liberia

TABLE IX-4

1980 AND 1985 PROJECTIONS OF TOTAL UNION FERTILIZER REQUIREMENT
(metric tons)

Nutrient	1974	Projections 1980	1985
N	11,738	22,000	33,000
P_2O_5	5,495	11,000	17,000

Source: Trade Statistics of Sierra Leone and Liberia

From the foregoing analysis, Union requirements in 1980-85 for nitrogen and phosphorous nutrients may meet the minimum requirements necessary for the consideration of a satellite plant importing ammonia and phosphoric acid as intermediates. The projection was based on a fertilizer growth rate of 12% annually. However, for the years 1975-1980 the continuous importation of finished fertilizers is recommended. The single annual competitive tender, for the supply of finished fertilizers used by Sierra Leone today, seems the most economic course for the two countries.

A third industrial alternative, a mixing plant which bulk blends finished fertilizers into NPK compounds is not useful because the pattern of demand in the Union Countries is not oriented towards these kinds of fertilizers.

Mano River Union Industry Recommendation

The fertilizer industry is not recommended as a Mano River Union Industry at this time. No studies are needed.

FRUIT & VEGETABLE PROCESSING

Economics of Industry Location

Both Sierra Leone and Liberia grow a variety of tropical fruit and Sierra Leone also produces a wide variety of vegetables. In both countries it has been suggested that an integrated fruit and vegetable canning complex could be set up including plantations for the production of canned pineapple products and tomato paste and to a lesser extent other fruits including mangoes, guava and paw-paw. While both countries produce oranges and grapefruit, the export market for these products is not as attractive because of intense competition. Pineapple and tomato paste are more attractive because of the excellent export market and because pineapple can be grown to mature most of the year. The plant would supply in addition to exports, the smaller domestic demand for both canned and fresh pineapples and tomatoes.

In order to support an economic canning plant operating most of the year a nucleus mechanized estate plantation must be developed capable of supplying at least two thirds of the canning requirements. Such a plantation has not been developed as yet in either country. Special fruit and vegetable strains have to be developed expressly for canning since the existing strains for fresh eating are not suitable for canning and the quality has to be high and uniform. It also is not economic to rely exclusively on individual farmers to produce and deliver vegetables and fruit to a cannery. This was the mistake made when a UK equipment supplier constructed the modern cannery at Kakata, Liberia; it has stood idle for 17 years now. The same mistake was made with the Ibadan, Nigeria cannery in 1956.

Canning pineapple strains must be developed and tested for quality and while the quality of some local tomatoes is good they have not been grown in volume. Pineapples and tomatoes of good quality are produced in Sierra Leone's Northern Province but the lack of marketing outlets has been a deterrent to production.

To develop an economic fruit canning facility, including plantation development might take up to six years. The plantations must be irrigated and a permanent system of roads must be built in order to provide access in all weather conditions. Agricultural operations of this magnitude must be mechanized and adequate machinery selected. This requires extensive government support. Sugar is another important raw material which, although now imported, will in the future be supplied domestically. The other important raw material, metallic cans will have to be imported. Due to the large number of expatriate technicians and managerial direction, labor costs will tend to be high.

In the above instance, lack of economies of scale are likely to be main problems. Food canning consists of a simple series of processes, but for hygienic and quality reasons, these have to be supported by constant laboratory and technical supervision. Also the proportion of overhead costs to total costs tends to grow with the number of

products canned. While there is a considerable range of possible substitution of labor for capital, there has been a growing tendency in the industry to substitute capital for labor to assure a quality product.

The successful Ivory Coast pineapple canning industry was developed with French management and large-scale public and private capital injections. In ten years it developed to supply the entire French market. However, these experienced French firms have not shown any interest in working outside the French speaking countries. Guinea's canning plant, while technically competent, has had financial and export problems and has not been profitable.

The minimum economic size of a pineapple canning factory is considered to be one processing 44,000 tons/year of fresh fruit to produce 26,500 tons of canned product. An economic size tomato paste complementary facility would produce 10,000 tons. The capital cost of the canning plant, and plantations to support it, might reach $25 million.

Market Analysis

The import demand for canned fruit and tomatoes is presented in the following Table IX-5.

TABLE IX-5

LIBERIA AND SIERRA LEONE IMPORTS OF TOMATOES AND FRUIT, 1970, 1974 AND 1980-85 PROJECTIONS

Country and Product	Import Volume, 000 tons				1974 Import Value, 000 Le/$
			Projections		
	1970	1974	1980	1985	
Liberia					
Tomatoes and Tomato Paste	0.3	0.7	2.0	4.0	460
Fruits (Fresh & Canned)	0.4	1.6	3.0	4.5	829
Total	0.7	2.3	5.0	8.5	1289
Sierra Leone					
Tomatoes and Tomato Paste	2.7	2.9	4.0	8.0	2207
Fruits (Fresh & Canned)	0.7	0.8	2.0	3.0	418
Total	3.4	3.7	6.0	11.0	2625
Total Union Market	4.1	6.0	11.0	19.5	3914

Source: Trade Statistics of Sierra Leone and Liberia

The estimated production from the canning plant in 1980 would be 26,500 tons of pineapple and 10,000 tons of tomato paste; or twice the domestic market for tomato paste and many times for pineapple, leaving a large surplus for export.

World exports of canned pineapple in 1970 were 380,000 tons. Primary exporters were the Philippines, Malaysia, Formosa, South Africa, U.S.A. and the Ivory Coast. World demand in 1980 is expected to increase at 6.2% per annum to 615,000 tons. It would therefore be possible for Sierra Leone or Liberia to secure a portion of this export market if they could develop a competitive industry in association with a "brand name". The estimated F.O.B. factory price in 1974 was approximately $11.00 for a carton of 24 cans ($2) of sliced pineapple and $8.00 for a carton of 100 cans (70 grams) of tomato paste. The price trend continues up.

Small-Scale Agro-Industrial Estate Program in Liberia

To encourage the development of small enterprise and the rural economy, the UNIDO experts attached to the Liberian Development Corporation have produced a plan to establish nine rural small scale agricultural processing estates in the country.[1] These Agro-industrial estates would, in addition to processing of agricultural products, undertake light manufacturing such as margarine, cooking oils and fats, soluble coffee, sugar, cosmetics, confectionery, etc. Wood processing could be included to produce veneers, plywood and sawn wood for both export and domestic use.

Feasibility studies for nine agro-industrial estates near Monrovia and in the Gbarnga, Sanniquelle, Zorzor, Voinjama, Kolahun, Kowahun and Foya Chiefdoms have been carried out by UNIDO to be developed over 9 years.

Each estate of some five acres would cost about $1 million and would contain the following small-scale processing plants:

1. Palm oil press and kernel recovery plant;
2. Sugar cane presses with crude sugar production capability;
3. Coffee hulling;
4. Cocoa bean processing plant including butter;
5. Citrus juice extraction plant with possibly tomato and cassava starch processing;

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[1] UNIDO: Report on the Establishment of an Industrial Estate in Monrovia on the Development of Small Scale Industry within Liberia, Report SS1.

E/3 UNDP: Construction of Agro-Industrial Estates in Rural Liberia (Project of the Government of the Republic of Liberia). These reports were prepared by Mr. E. R. Adams, the UNIDO Small Industry and Industrial Estate Advisor in Monrovia.

6. One canning unit for all process;

7. Additional units would be incorporated for local manufacturing process such as timber, as required;

8. Warehousing and services for all facilities.

The Liberian Development Corporation will provide the technical and managerial guidance of the projects with UNIDO advisors undertaking the training of Liberian management and personnel. US AID is also contributing advisors for the program. The establishment of farmers cooperatives for each estate is part of the program under the organization and guidance of an expert.

FAO's Criticism of the Agro-Industrial Estate Program

However, the FAO's Marketing Economist, Mr. M. G. Fenn, believes that it will not be possible to operate the UNIDO agro-industrial estate programs successfully in rural Liberia.[1] The FAO report argues that the UNIDO project proposals have four serious defects:

1. Supplies: That the Report is over-optimistic on the availability of produce of the necessary quantity and quality required for processing and at suitable prices. Considering the limited resources available to the farmers and the priority of their subsistence needs, the FAO Report warns that one cannot presume on such big and rapid increases in production for market, especially in the case of tree crops.

2. Markets: The Report neglects the fact that market outlets for the proposed processed products are, in most cases, very limited or virtually non-existent at acceptable prices.

3. Organization: The proposals made inadequate provisions for the ownership and management of the estates, for the organization of crop supplies and for the distribution and sale of products. The FAO Report could not agree that, starting almost from scratch, farmers' cooperative organization can be built up within a few years in Liberia to take over such heavy and complex responsibilities.

4. Concept: Although the FAO Report agrees that the establishment of agro-industrial estates in rural areas is an attractive concept, especially as the central feature of an integrated rural development program, nevertheless, the project does not seem to conform to the realities of agriculture and economics. Unlike urban industrial estates, the economic base for rural agro-industrial estates does not exist.

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[1] M. G. Fenn, Report on Proposals for the Establishment of Agro-Industrial Estates in Rural Liberia, LIR/72/012, March 1973.

Resurrection of the Kakata Cannery and the World Bank's Agricultural Program

The FAO instead favored the construction of a plantation and cannery for processing citrus and pineapples for the local market. A similar cannery was constructed 17 years ago with UK equipment at Kakata, 50 miles inland from Monrovia, but was abandoned after a few years of attempted operation with the equipment virtually unused, largely because of the failure to develop an adequate fruit supply.

In 1973, the World Bank Team recommended that Liberia consider the "valid objections" of the FAO expert noting that an attempt to restore the Kakata cannery was underway and that it would be advisable to wait and watch its progress before launching nine more similar projects.

However, the current World Bank financed rural development programs in Sierra Leone and in Liberia are directed toward the improvement of the small farmers' economy rather than the undertaking of the larger-scale modern agriculture projects required to support modern industrial establishments.

Recommended Mano River Union Industrial Policy

A large-scale export oriented pineapple-tomato canning project could be considered a Mano River Union Industry as it would also serve the domestic market. However, the extent of the investment and technical know-how to develop both the plantations and canning factory plus the preparatory work which the governments need to undertake to organize small holder peasantry to produce and cultivate plantations has made this industry a nonstarter in these countries for years. The modern canning factory set up in Liberia at Kakata some 17 years ago, has never operated economically because of the failure to develop an adequate agricultural plantation to supply it.

This is an industry which must await new programs and policies in agricultural development in both countries. The present UNDP and World Bank supported agricultural programs are directed toward small scale processing facilities to serve the domestic markets.

It is not recommended that the Mano River Union sponsor a prefeasibility study for a large-scale export oriented canning industry at this time.

EDIBLE OIL SEED CRUSHING INDUSTRY

Economics of Industry Establishment

Sierra Leone and Liberia both depend almost entirely upon palm oil for their domestic cooking oil supply. Most of the palm oil is extracted from the wild palm fruit by farmers in small crushing and boiling vats. The palm kernels of the fruit are then sold to the Marketing Boards for export. There are also projects underway for setting up palm oil mills in both countries including new large estate plantations to provide additional palm oil for the domestic market.

The Sierra Leone Produce Marketing Board buys from the farmers all major agricultural export crops. The prices obtained abroad generate considerable government revenues. The Board established a palm kernel crushing industry in 1967. This mill operated for only a year before it was closed down as uneconomic. The mill was established by a French Consulting Firm, OCODIS, and after its failure the Beoku-Betts Commission of Enquiry found in 1968 that the plant had been over capitalized with obsolete used equipment. This long idle mill was restored to operating condition by the Marketing Board in 1972-1973 with some new equipment obtained from another consultant and has been operating since 1974 managed by the Consulting Firm, ISTARO AG, a subsidiary of the Paterson, Simons and Ewart Group of the United Kingdom. Their management contract provides for a 5% fee on total FOB sales value of oil and cake exports, regardless of whether a profit is realized from the plant's operation. The firm supplies four expatriate staff and is responsible for all marketing abroad and reports to the Ministry of Trade and Industry rather than the Sierra Leone Produce Marketing Board. The Marketing Board has been required to sell the palm kernels purchased from the farmers in Sierra Leone to the mill at cost of purchase rather than at their export value. In 1974, the cost of purchase was Le94 per ton, whereas if the Marketing Board could have exported the kernels it would have realized Le326 per ton. Thus a substantial volume of the Marketing Board's potential profits, were transferred to the palm kernel mill. (The profits foregone are estimated below to total Le4.7 million in 1974.)

There is reason to believe that the Wellington palm kernel mill has not contributed any economic return to the Sierra Leone economy. This judgement is based upon analysis of the realized prices obtained in 1974 for exports of palm kernel oil and cake versus kernel exports as shown in Table IX-6.

The gross value added per ton of palm kernels processed by the mill can be calculated by the following formula:

(proportion of oil extracted) times (export value of oil) plus (proportion of cake extracted) times (export value of cake) less (the export value of palm kernels).

TABLE IX-6

F. O. B. PRICES REALIZED FOR SIERRA LEONE PALM PRODUCT EXPORT SHIPMENTS, 1974

Product	Volume, 000 tons	Value, million Le	FOB prices, Leones per ton
Palm kernel	24.9	8.0	326
Palm kernel oil	8.4	5.3	673
Palm kernel cake	5.5	0.4	84

Source: Trade Statistics of Sierra Leone

For each ton of palm kernels milled, the mill when efficiently operated realizes 43% by weight of oil and 47% by weight of cake. The gross contribution of the mill is calculated as follows:

(0.43 x Le673) + (0.47 x Le84) - (Le326) = Le3 per ton of kernels.

Thus the mill had virtually no economic return (Le3 per ton) to cover any of its substantial operating costs, including electricity, fuel oil, labor force and the foreign management contract, to say nothing of a return on the more than Le1 million capital recently invested in the plant.

The diseconomy of the palm kernel mill can also be demonstrated by comparing what the Marketing Board would have earned by exporting the kernels versus what the mill earned by exporting the oil and cake. If the Marketing Board had been allowed to export also the 20,000 tons of kernels which the Mill processed they would have realized at Le326 per ton, another Le6.5 million, at a profit of Le4.7 million over the cost of purchase paid to the farmers and agents. In 1974, the mill sold the 8,409 tons of kernels and 5,500 tons of the cake produced from these 20,000 tons of kernels for a total of only Le5.7 million. Adding another Le300,000 for the unsold cake, this involved an out-of-pocket loss of Le0.5 million, even before taking into account the operating costs of the mill including the foreign exchange spent on fuel, machines and expatriates management.

The mill might find some economic attraction if the palm kernel oil were utilized in domestic manufacturing industry in the country, such as toilet soaps, margarine, and the cake to feed cattle. However, as no such industries exist, it would appear to be in the Government's interest to close down the palm kernel mill given the higher relative value it can receive for its kernel exports. The F. O. B. prices realized for oil and cake exports might also be improved by more economic marketing and shipping arrangements, but given the present management contract and shipping conference tariffs this also does not appear likely.

The Sierra Leone Produce Market Board has also attempted to establish other oil seed processing industries but all with no economic success. There were plans for the Wellington Palm Kernel mill to also process cocoa beans into cocoa butter which never materialized and given the history of the existing mill and the poor returns realized by the larger cocoa butter plants in Ghana and Nigeria the government has probably benefitted by the failure to proceed. Expensive plants to refine the palm kernel oil and to produce cake pellets at Wellington have never been used as there is no domestic market for the products. Machinery for an "instant" coffee plant was also imported five years ago and still lies in crates up country. Some palm oil mills are also idle.

Another industry which has more recently started up is a benni or sesame seed crushing plant to provide a supply of lower priced baby food. However, this plant appears unlikely to produce at a price to compete with the existing high priced imported dairy and non-dairy baby food supplements and will require substantial continuous subsidies from UNICEF. As with the other edible oilseed projects, there is no evidence that any competent industrial feasibility study was performed and again it appears that the only beneficiary again has been the equipment suppliers.

There are other Sierra Leone projects for increasing the output of edible oils including two large oil palm plantations under way and a coconut palm plantation on Turner's Peninsula in addition to encouraging extension of small farmer plantations of oil palms. The coconut project will be largely aimed at the export market. Similar efforts to expand small holder oil palm production are under way in Liberia along with a major new commercial plantation feasibility study being performed for the Government by French Consultants from the Ivory Coast.

These edible oil projects do not need large scale processing plants to realize their benefits, and classification as a Union Industry by the Mano River Union is not required to enhance their economic attractiveness.

Recommended Mano River Union Industry Policy

Given the uneconomic history of the oil seed processing industry, and the fact that this industry must first be rationalized as an industry within the domestic economies, it is not recommended that the Mano River Union engage in any further industrial feasibility study activities in this area. The industry would not appear to benefit from Union Industry classification.

SUGAR INDUSTRY

Economics of Industry Establishment

The sugar cane industry is long overdue in Liberia and Sierra Leone. Africa as a whole, has remained one of the major sugar importing regions of the world, in spite of the fact that sugar cane can be grown economically in most countries in Africa. In contrast most of the industrial countries have continued to subsidize their uneconomic beet sugar industries.

Sugar cane projects have been successfully established in Nigeria, Ghana and Ivory Coast.

A modern optimum economic size cane sugar industry consists of a basic sugar plantation of some 7,000 hectares capable of delivering 300,000 tons of cane per year to an associated sugar mill which is sized to crush the cane during the harvesting season. The mill will produce approximately 30,000 tons of sugar, plus molasses and bagasse as by-products. The permanent labor force would be 1,300 plus 30 Supervisors. Seasonal workers another 500. Smaller size sugar projects of 15,000 tons capacity, although higher cost, are feasible at today's sugar prices.

There are additional economies to be realized in an irrigated plantation because the harvesting and milling season can be spread over three months of the year allowing a smaller more economic size factory. Also the ability to hold back water from the cane for a week prior to harvesting increases the sugar content of the cane. Sugar cane harvesting can be labour intensive, or mechanized; the projects in Liberia and Sierra Leone will use labour intensive cultivation.

Market Analysis

The imports of sugar and sugar products into Sierra Leone and Liberia are presented in Table IX-7. By 1980 sugar consumption will reach 10,500 tons in Liberia and 30,000 tons in Sierra Leone. These are adequate markets to support domestic sugar cane industries. Furthermore, as the cost of production is anticipated to be below world prices, other West African countries will provide export marketing opportunities.

Status of the Industries Development

Liberia is constructing a 12,000 ton per year sugar project with Taiwan assistance planned for production in 1977. In Sierra Leone the Peoples Republic of China is preparing a feasibility study for a 30,000 ton/year irrigated project 100 miles inland from Freetown.

The Liberia Sugar Corporation Project

The Liberian project, costing some $15 million, is expected to become operational in 1977. The public corporation is managed by a Liberian, but the technical and

engineering management are provided by Chinese (Taiwan) sugar technicians. About 25 Liberians were sent to Taiwan in 1974 for intensive training in preparation for assuming technical management of the project.

There has been a problem of finding the proper cane variety which can thrive in the rainy Liberian climate and provide a satisfactory sugar yield per acre. The Taiwan varieties planted last year are not yielding satisfactorily. If the planned yield per acre of sugar cane can be achieved, they will grow 123,000 tons of cane on 6,000 acres and produce 11,800 tons of sugar in 155 milling days per year.

It is also planned to purchase an additional cane supply of 30,000 tons from out growers so that the grinding capacity will be increased to a total of 153,000 tons of cane, or 14,500 tons of sugar in a 200 day milling season. The project will also produce molasses and there are plans to establish an alcohol distillery.

The mill will generate its own power. Following initial operation, additional power will be obtained from the Harper Power Plant.

Sierra Leone Sugar Project

In 1967 the United Kingdom Government financed a comprehensive feasibility study for a sugar project near the coast, east of Freetown. The study was performed by Bookers and Sir Alexander Gebbs, Engineers. The project was estimated to cost $22 million and called for a 3,200 hectare nucleus plantation plus outgrowers, and a sugar mill capable of producing some 32,000 tons of sugar per year.

The project was never implemented partly because of the low so called free market prices prevailing for the small fraction of sugar moving outside the protected markets of the industrialized countries at that time.

The rapid rise of sugar prices in 1974 led the Sierra Leone Government to request assistance from the People's Republic of China in implementing the sugar project. The Chinese felt that location of the project should be shifted inland to take advantage of the additional sunshine and of irrigated development to increase sugar yields. They have started trial cane plantings and reportedly will deliver a feasibility report in early 1976 for a scheme capable of expansion to supply the entire Sierra Leone Market.

Tate and Lyle also surveyed the industry for a Lebanese investor and the Government in 1975.

Recommended Mano River Union Industry Program

Both Countries have sugar projects in hand adequate to supply their domestic markets. Costs of production should be below world prices allowing each country to export any surplus. Liberia may have export potential in 1978, a year or so before Sierra Leone's production.

The project should make a good return by selling at world prices and should not require any tariff concessions or protection in the Liberia or Sierra Leone export markets. Consequently, the industry would not appear to require Union status.

No Mano River Union Pre-Feasibility study is required.

TABLE IX-7

LIBERIA AND SIERRA LEONE SUGAR IMPORTS
1970, 1974 and 1980-85 PROJECTIONS

Country & Product	Volume of Imports, Metric tons		Projections		1974 Value of Imports, Le or $	
	1970	1973	1980	1985	Total 000	Per Ton
LIBERIA						
Refined Sugar and other Sugar Products	5,975	7,290	10,500	14,000	2,191	300
SIERRA LEONE						
Refined Sugar and other Sugar Products	29,757	27,256	30,000	36,000	6,656	244
Total Union Market	35,732	34,546	40,500	50,000		

Source: Annual Trade Statistics, Sierra Leone and Liberia

CASSAVA PELLETS/CHIPS

Economics of Industry Location

Liberia and Sierra Leone like most Tropical African Countries grow cassava. It has been suggested that a cassava pellet animal food export industry be established as a Union Industry in either Sierra Leone or Liberia. Cassava is utilized as a food stuff for cattle and poultry in the European compound animal feed industry. As it is predominantly starch and lacks protein and vitamins it can only be used in a mixed feed stock. Cassava of course has the same shortcoming as a dietary base for humans, which coupled with its low yield per acre explains the shift to rice consumption as economies develop.

Several things would have to occur before an economically feasible cassava pellet export plant could be established. As cassava is consumed as a staple food in African countries, expecially when rice is not economically available, there must first be an expansion in cassava root production. This could be encouraged by establishing a Marketing Board purchasing program for dried cassava chips prepared by the small peasant farmer. There has been no attempt to do this in either country. In peasant agriculture the yield of cassava root per acre is low because of poor cultivation techniques and partly because of the extended use of the cassava leaves as a vegetable (which diminishes root tuber development). To create an incentive for the farmer to produce roots instead of leaves, an adequate price must be established for the purchase of the dried root. However, attempts to maintain the tropical wide disparity between farm price and export price realised (up to 100%) in virtually all existing Marketing Board commodity programs would likely result in the setting of farm price which would attract little supply.

In any event if there is serious interest the program could be tested as the costs of sun drying the cassava root are not great and all the unskilled labor required for harvesting, transporting and drying the roots will be supplied by the farmer family in rural areas if the price is right.

If adequate supplies of chips are forthcoming they can be exported directly prior to making a decision to establish a pelletizing plant. (An idle plant exists in Freetown.)

The minimum economic productive capacity of a cassava pellets plant is considered to be about 20,000 metric tons annually. As shipments are made in bulk, the plant would best be located near a navigable river enabling the transport of bulk pellets in barges to Freetown or Monrovia.

The domestic market for animal feed in Sierra Leone and Liberia is quite low and is not adequate to support the construction of a cassava pellet factory. The existing animal feed plants in Sierra Leone utilize domestically grown maize and imported fish meal. In Liberia all ingredients are imported. Current production in each plant is about 2,400 tons annually, and production could be doubled, if the market

existed. Both plants utilize some of the local flour mills high protein grindings from the outer shell of the wheat, but most of it is exported.

Other potential animal feedstuffs, such as brewer's waste mash are dumped in both countries. Another high protein animal (or human) feedstuff, palm kernel cake, is produced in both countries and is almost entirely exported to Europe for cattle feed because of the lack of a domestic market (even though shipping costs eat up over half its landed value in Europe).

In the meantime, there is a complete brand new pelletizing plant standing idle at the Sierra Leone Palm Kernel mill in case the government wishes to expand the animal feed market. The mill also has a new unused oil refining plant capable of producing oil for a domestic margarine industry.

The inadequate local market means that any justification for a cassava pellet plant has to depend on export to the EEC Countries, which have a highly developed compound animal feed industry. The prices of feedstuffs have been increasing as the consumption per head has risen with modern feeding techniques.

Thailand has been the only major supplier of cassava pellets to the EEC Community, with exports in 1972 at 1.2 million tons. Cassava is not a staple food in Thailand and the cassava has been developed and grown by competent small farmers as an export commodity. Brazil, Indonesia and Malaysia also export minor amounts. EEC demand in 1980 could grow to over 6 million tons, to replace higher priced feedstuff components.

Thailand can increase its production to meet part of this demand as her estimated production costs are low ($63/ton estimated 1974 average FOB price Bangkok). Furthermore, Bangkok realized much more favourable shipping rates, than those of West Africa. The dry cargo freight tariff from Bangkok to Marseilles or Genoa was only $25.50/ton in October 1975; whereas the West African rate for the much shorter distance to Rotterdam was $42.00/ton.

This is the difficult competition today, which a cassava pellet plant in either Sierra Leone or Liberia would have to meet to secure a portion of this market. It certainly does not offer any bright prospect for the investor in the pellet plant, but a future shortfall in Thailand's production might make the price more attractive.

Mano River Union Recommendations

The cassava pellet industry cannot be justified as a Mano River Union Industry to supply the domestic animal feedstuff market given the small market which the existing feed mixing plants can offer.

It is also difficult, based upon existing evidence, to make a case for establishing it as an export industry in either country. This judgment could be inexpensively tested in either country by establishing a Marketing Board purchasing program to encourage peasant production of cassava root chips.

FIBER BAGS OR SACKS

Economics of Industry Establishment

A number of West African countries have established industrial sack factories based upon imported jute blended with locally grown fibers such as urena-lobata or kenaf. These plants have had economic difficulty competing with low cost jute sacks from Bangladesh and India. Another difficulty has been the development of an adequate and economical supply of domestic fiber. The fibers grown in Nigeria and Ghana include both Kenaf and Urena-Lobata.

The 100 loom sack factory established in the 1960s by the Nigeria Government at Badagry, Nigeria started production based upon blending locally grown urena with imported jute and then because of inadequate fiber supplies shifted to locally grown Kenaf. The plant is currently out of production and is being re-equipped and new management supplied by a British consulting firm. One of the international manufacturers of jute sack machinery, James Mackie & Sons of Belfast, observed that the Badagry plant was not originally equipped for the fibers utilized and that the management was poor.

In West Africa, the requirement for high cost expatriate management and technical staff has meant that the industry is uneconomic below the level of a 32 loom plant producing approximately 3 million sacks per annum.

The economies of scale increase with larger plant size primarily because the same 2-3 expatriate managerial staff (Plant Manager, Production and Maintenance Manager and Controller) can handle the larger plants spreading their high cost over the larger output.

The existing sack factories in West Africa include plants at:

Jos, Northern Nigeria, 200 looms;
Badagry, Nigeria, 100 looms;
Ghana, 200 looms;
Cameroun, 32 looms;
Mali, 60 looms;

The development of this industry has generally been undertaken for governments by equipment suppliers who have also supplied the expatriate management services. They have generally limited their equity participation to a minority share consisting of part of their anticipated profits from supplying the equipment and management contracts.

Raw Materials, Labor Force and Infrastructure Availability

The jute sack factories of Bangladesh and India are highly competitive with low cost labor and management operating economic large-scale plants of up to a million looms.

Their export prices for sacks are low, less than twice the cost of the embodied raw jute. For this reason a sack factory in Sierra Leone or Liberia would not be marginally competitive unless it were partially based upon a domestic jute substitute fiber supply. Sierra Leone is the only country experimenting in growing a jute substitute; the Government has undertaken an experimental program with Urena-Lobata and planted 91 acres. The project is currently the subject of three technical assistance programs, a FAO jute expert from Cambodia, Mr. Mitra, arrived in the country in October 1975 financed by UNDP to manage the program. The United Kingdom Tropical Projects Institute is supplying technical assistance and some urena retting and ribbing machinery, and finally a team of 3 experts arrived in November 1975 from the PE Consulting Group Limited, paid for by the United Kingdom Commonwealth Assistance Program, to undertake for the Ministry of Trade and Industry a pre-feasibility study for the industry.

The Ministry of Agriculture which is managing the urena program did not appear to be aware of the fielding of the Ministry of Industry study. In any event Sierra Leone will not be in a position to make a decision on whether to expand the crop to a commercial operation until after another year of experimental results. If the crop is considered feasible, i.e. capable of profitable production at an export price of 8¢ per lb, the Ministry has plans to plant up to 5 thousand acres near the experimental plantation at Newton. The Ministry hopes for a yield of 0.8 tons per acre which would provide an export crop of 4 thousand tons.

The PE Consulting Group team are touring all West African sack plants and will provide the Sierra Leone government with an analysis of how this industry has been established in the other countries, names of equipment suppliers, sponsor, etc., and an appraisal of the economics of the industry and export marketing opportunities for urena. This report should help the government to appraise the economic attractiveness of entering the sack producing business.

Each jute sack weighs approximately 1 kilogram and, assuming a 50-50 blend of urena with jute, the minimum economic size factory producing 3 million sacks annually would require 1,500 tons of urena which would be well within the possible production at Newton if the experimental plantings are successful.

It would appear that a sack factory might be located best in an inland town near the plantation where the local economy would benefit from the regional diversification of this industry. The town would have to offer a minimum infrastructure, including electric energy supply. The plant would require 2 or 3 expatriate staff in the early years of operation and the plant location must take into consideration the requirement to attract and maintain this staff.

Market Analysis

The Liberian and Sierra Leone statistics on industrial sacks of textile materials imports include data on sacks of plastics and man made fibers. Only the sack imports of jute material were selected by choosing the export originating points of Bangladesh

and India. These statistics are presented in the Table IX-8 and indicate an imported level of approximately 1 million sacks fc Sierra Leone and 1/3 that number of Liberia. Jute sacks cost an average of 32¢ each in 1973 and 50¢ in 1974, later prices up to 75¢ were reported reflecting higher (temporary) world wide jute prices. Synthetic material sacks were selling for 17¢ to 25¢, largely imported from West Germany and Taiwan. As they are generally priced at half the price of jute sacks, the market for jute sacks would not appear to be greatly expandable at the expense of plastic sacks.

TABLE IX-8

SIERRA LEONE JUTE SACK IMPORTS
1970, 1973 AND PROJECTION FOR 1980

Imports, 000 Sacks				Value of Imports, Le or $	
		Projections			
1970	1973	1980	1985	1973 Total	1973/sack
880	965	1,200	2,000	306,000	0.32

NOTE: The Liberian Jute Sack imports could not be segregated from those of synthetic fibers. However the demand appeared to be less than a third of Sierra Leone. This would indicate a total Union Market demand in 1980 of some 1.7 million sacks, or about half the volume required to justify a minimum size sack mill. In 1985 the market may be adequate.

While the market for jute sacks is likely to increase with expanded domestic rice production (and the supply of second hand sacks diminish with reduced sacked rice imports), the estimated Union import requirement of some 1.7 million sacks in 1980 is only about half the 3 million sack output of the minimum economic size plant (see Table IX-8). Any export sales to neighboring countries, including Guinea, will have to be competitive with low-cost Bangladesh sacks.

Recommended Mano River Union Industry Policy

This industry would be a possible candidate for Union Industry classification to supply both markets if it could be developed economically. However, we are two years away from determining if Urena fiber can be grown in Sierra Leone. A decision to establish a sack factory must await the results of the agricultural experimental program underway in Sierra Leone with United Kingdom technical assistance.

There is no need for a Mano River Union sponsored pre-feasibility study at this time.

ALUMINUM DOMESTIC UTENSIL INDUSTRY

The industry is typically a small scale industry in developing countries. There is one entrepreneur employing eleven workers producing aluminum pots in Voinjama, Liberia. Most African countries have one or more plants of this type. The plants typically import aluminum circles of the required diameter which are tempered and pressed into shape on a punch press. The press is equipped with various dyes for the different shape pots and covers. Circles of aluminum are imported, rather than sheet, because it is uneconomical to recycle aluminum scrap. Additional machinery consists of a burnishing machine, a drill press and riveter for attaching imported handles.

The moderate skill levels required can be acquired on the job under guidance. The work force of the railway workshop in Sierra Leone included dozens of much higher skilled workers, now unemployed. This industry might be added as a production section if the workshop is reconstructed as proposed.

The 1974 imports of aluminum utensils in Sierra Leone totalled Le294,000 and in Liberia $304,000. Most of the imports were low cost from Asia or Eastern Europe. The average cost per pound of Liberian imports was $1.18. A local plant importing aluminum circles at $0.75 per pound would have a difficult time competing with these low cost imported pots and pans.

Mano River Union Industry Recommendations

This is a small scale industry best developed as a section of an existing metal fabricating operation, or as a cottage industry catering to the domestic market. Because the economics of the industry is marginal and the economies of scale are not significant, the industry is not recommended for development as a Union Industry. However, small producers may benefit in the future from a customs union elimination of tariff barriers.

SECTION X

INDUSTRIAL STUDY PROGRAM CONTINUITY

Phase I of the UNIDO Contract with Sanderson & Porter relating to pre-investment studies of Union Industries in Sierra Leone and Liberia was essentially a mission to identify economic and viable industries which might be established in these countries as 1) import substituting industries serving the combined markets and 2) export industries. In addition, Phase I's objective included recommending, from the list of identifiable industries, those which required pre-feasibility studies. These studies would be undertaken in Phase II.

The study succeeded in recommending nine import substituting industries and four export industries for possible development. However, only four of these industries required new pre-feasibility studies; paper pulp, plywood, glass containers and Sardinella fishing.

The time allotted in Phase I was only sufficient to evaluate twenty-two industries and other industries can be identified as having potential for Mano River Union status. It is recommended that Phase II also include a continued review of potential Union Industries.

Phase II would encompass the preparation of pre-feasibility studies of paper pulp, plywood, glass container and Sardinella fishing processing industries. These studies would entail analysis of each industry to develop economic information about the industries in sufficient detail to interest potential investors. The studies would include plant sizing and outline design, site evaluation and location, and approximate estimates of capital investment and production costs. A financial analysis would provide a preliminary measure of the project's viability, including an evaluation of marketing opportunities.

The industrial engineer-economists responsible for the execution of Phase II would include specialists in each of the industries recommended. As required, the personnel would also undertake a continued review of other Union Industry possibilities.

In the initial stages, Phase II should require some 5-6 months to complete. Should further industries be identified, the study would be extended for the additional time required for completion of any pre-feasibility studies needed for the newly identified industries.

ANNEX TABLES

The following tables are included in this Annex:

1. Sierra Leone and Liberia Major Imports, 1974, Ranked by Magnitude in Sierra Leone

2. Liberia's Imports of Selected Commodities, 1969-1974

3. Ad Valorem Duties on Imported Products, Liberia and Sierra Leone, 1975

4. Liberian Industrial Projects Planned and in Progress as of April, 1975

5. List of Liberian Manufacturing Projects Under Construction or Proposed, 1975

ANNEX TABLE 1

SIERRA LEONE AND LIBERIA MAJOR IMPORTS, 1974 RANKED BY MAGNITUDE IN SIERRA LEONE

Rank	SITC Code	Product	Value of Imports	
			Sierra Leone, Le(000)	Liberia, $(000)
1.	331-000	Petroleum, crude and partly refined	18,820	53,191
2.	040-000	Rice	15,069	15,828
3.	652-060) 652-079)	Cotton woven fabrics, printed, dyed	7,067	6,494
4.	732-000	Passenger cars	6,289	7,007
5.	652-079	Sugar, refined	4,904	2,776
6.	046-000) 041-000)	Wheat	4,735	1,088 [1]
7.	652-050	Cotton woven fabrics, white bleached	4,716	1,266
8.	653-050) 653-053)	Synthetic fabrics	3,545	2,989
9.	732-300	Lorries and trucks	2,889	8,442
10.	712-500	Agricultural tractors	2,813	501
11.	541-790	Medicaments (other)	2,679	3,043
12.	674-840	Iron and steel plate and sheet	2,575	3,697
13.	718-429	Bulldozers and construction equipment	2,521	11,113
14.	554-110) 554-120)	Soaps and powders	2,429	836
15.	661-200	Cement	2,211	2,428
16.	851-300	Footwear, leather	2,198	1,042
17.	121-000	Tobacco, unmanufactured	2,159	569
18.	055-530	Tomato puree, paste	2,153	443
19.	911-000	Postal packages	2,594	2,730
20.	267-011	Used clothing, bulk	1,622	54 [2]
21.	722-110	Electric generating sets	1,587	405
22.	724-000	Telecommunications equipment	1,573	738
23.	031-100	Fish, fresh, chilled or frozen	1,585 [3]	5
24.	332-511	Oil lubricants	1,448	2,345
25.	697-211	Domestic holloware, iron and steel	1,427	885
26.	732-800	Bodies, chassis and other parts of cars	1,336	6,431
27.	678-000	Steel tubes, pipes and fittings	1,313	2,214
28.	711-590	Parts of internal combustion engines	1,245	1,159
29.	729-119	Primary batteries and cells	1,233	982
30.	099-040	Sauces, mixed seasonings	1,126	202

1 Meal of Wheat imported into Liberia for milling rather than wheat.

2 Used Clothing imports are prohibited in Liberia.

3 Includes fish transhipped across Sierra Leone.

ANNEX TABLE 1 (Cont.)

Rank	SITC Code	Product	Value of Imports: Sierra Leone, Le(000)	Value of Imports: Liberia, $(000)
31.	122-200	Cigarettes	1,077	1,439
32.	045-990) 044-000)	Cereals, unmilled	1,020	270
33.	421-900	Soya bean, cotton, sunflower seed, rape oils, etc.	1,012	385
34.	893-900	Other articles of artificial plastic materials	952	650
35.	022-120	Milk and cream, evaporated, unsweetened	916	1,035
36.	046-010	Flour of wheat or meslin	902	253
37.	673-200	Steel bars and rods, drills	898	1,907
38.	022-200	Milk and cream, dry	892	836
39.	652-010	Cotton fents	838	N.A.
40.	629-120	Tires, cars and motorcycles	802	871
41.	631-200	Plywood	795	799
42.	054-510	Onions and garlic, fresh	770	245
43.	091-410	Margarine	758	580
44.	656-600	Blankets	720	240
45.	719-212	Pumps and parts	718	414
46.	656-100	Bags and sacks, textile	703	150
47.	841-021	Mens, boys outer-garments	679	1,187
48.	723-100	Insulated wire and cable	668	173
49.	712-110	Agricultural Machinery and equipment	665	330
50.	048-200	Malt	665	506
51.	732-290	Buses and coaches	654	879
52.	514-990	Inorganic chemicals	646	588
53.	642-110	Packing containers, paper	645	701
54.	653-010	Fents of man-made fibres	637	N A
55.	718-424	Mining machinery	636	4,193
56.	629-140	Rubber Tires, tractors, earthmovers	621	2,540
57.	698-100	Locksmith wares	607	585
58.	851-200	Footwear, (rubber)	598	182
59.	629-130	Rubber Tires, trucks, buses	587	782
60.	892-110	Printed books, pamphlets	526	486
61.	725-011	Refrigerators, household	525	588
62.	047-000	Meal and flour	511	177
63.	734-800	Aircraft	506	759
64.	851-100	Footwear (plastic)	501	226
	Total Value of Above Imports		Le133,000	$166,000
	Value of Total Imports		187,676	288,487

Source: Annual Trade Statistics, Liberia and Sierra Leone

ANNEX TABLE 2

LIBERIA'S IMPORTS OF SELECTED COMMODITIES, 1969 - 1974

Commodity Description	Weight Unit	Quantities						Values, (000) $US					
		1969	1970	1971	1972	1973	1974	1969	1970	1971	1972	1973	1974
Sugar	(000) lbs.	8,364	13,153	14,022	12,787	16,248	11,719	481	782	1,048	1,270	2,193	2,776
Fibre bags	N. A.	--	--	--	--	--	--	141	123	209	403	244	514
Fruit, processed	(000) lbs.	86	123	180	201	199	141	27	35	54	68	74	63
Vegetables, processed	(000) lbs.	539	701	978	831	554	595	131	182	272	243	188	237
Rubber products	(000) lbs.	692	623	1,069	516	830	1,016	317	361	677	447	692	896
Oil seeds	(000) lbs.	134	71	75	120	83	120	22	9	14	18	15	91
Vegetable oils	(000) lbs.	528	753	367	523	911	1,646	111	158	88	121	227	387
Paper products	N. A.	--	--	--	--	--	--	996	1,155	1,318	1,667	1,922	2,813
Articles of wood	N. A.	--	--	--	--	--	--	10	51	62	44	95	42
Cotton fabrics	(000) sq. yds.	29,310	28,302	30,168	42,240	16,257	12,490	7,923	6,459	8,014	9,711	6,120	6,494
Clothing	N. A.	--	--	--	--	--	--	6,819	3,904	4,755	5,388	5,535	6,406
Salt	(000) lbs.	4,224	6,722	7,340	7,284	7,472	9,522	121	173	202	236	245	412
Agricultural Machinery	N. A.	--	--	--	--	--	--	1,111	1,406	1,148	830	917	6,044
Aluminum Utensils	(000) lbs.	88	109	151	207	125	261	108	128	180	182	151	308
Cement Clinker	(000) lbs.	--	43,627	124,472	93,087	131,137	108,253	601	359	1,176	1,407	1,890	2,427

Source: Annual Trade Statistics, Liberia

ANNEX TABLE 3

AD VALOREM DUTIES ON IMPORTED PRODUCTS LIBERIA AND SIERRA LEONE, 1975

SITC Number	Commodity	% AD Valorem Tariff Rate	
		Sierra Leone	Liberia
061-200	Sugar, refined	Le80 a ton	4¢/lb.
554-170	Common washing soap	40%	15¢/lb.
554-200	Detergents	40%	40% or 15¢/lb.
629-110	Rubber Tires	40%	40%
629-199	Rubber inner tubes for motorcycles and cars	40% (Inner tubes m/cycles) -20%	40%
631-100	Veneer, plywood	0.35c. cu. ft. or 30%	40%
631-880	Other wood simply shaped	40%	40%
632-300	Wood products	40%	40%
632-890	Building boards of wood pulp	40%	40%
641-100	Paper Products (Newsprint)	Le3 a ton	Free
642-980) 642-110)	Other Paper products	40%	11%
651-010	Cotton yarn and cotton sewing	Le5.50 per 100 lbs.	11%
651-030	Thread	40%	11%
652-010	Cotton fents	Le35 per 100 lbs	N. A.
652-020) 652-080)	Cotton textile other than fents	30% or Le8.75 per 100 sq. yds.	20¢/sq. yd.
653-010	Fents of man-made fibres	Le25.00 per 100 lbs. or 45%	N. A
653-020) 653-090)	Textiles of man-made and synthetic fibres other than fents.	Le10 per 100 sq. yds. or 45%	40¢/sq. yd. or 40%
656-100	Bags, sacks of textile	Le7.70 per 100 lbs.	11%
661-200	Cement	15%	11%
661-300	Cement pipes	40%	11%
661-330	Other articles of cement	40%	11%
665-111	Glass Containers for beer and other beverages	40%	11%
665-119	Other bottles and jars	40%	11%
665-810	Other glass products	40%	40%
673-100	Iron and steel wire rods	40%	11%
674-100	Bars, rods, angles, shapes, universals of iron and steel	40%	11%
674-300	Light and medium steel plates	40%	11%

ANNEX TABLE 3 (Cont.)

SITC Number	Commodity	% AD Valorem Tariff Rate	
		Sierra Leone	Liberia
674-890	Sheets of iron and steel, corrugated roofing sheets and other light coated sheets less than 3mm of iron and steel	40%	11%
677-000	Iron and steel wire	40%	11%
678-000	Tubes, pipes and fittings of iron and steel	40%	11%
694-111	Roofing nails and other nails	Free	3¢/pd or 30%
694-210	Tacks, nuts, bolts and screws of iron and steel	40%	11%
697-211	Domestic holloware of iron & steel	25%	40%
697-219	Iron & steel household equipment	40%	40%
712-110	Agricultural machinery	40%	Free
712-930	Appliances and parts for agricultural machinery	Free	Free
821-100	Wooden furniture	55%	40%
821-200	Other furniture	40%	40%
892-910	Paper and paper board, labels	40%	40%
051-800	Fresh fruits	15%	10¢/lb.
081-810	Animal feed	Free	11%
231-000	Crude rubber	40%	40%
243-500	Sawn lumber	40%	40%
251-000	Pulp and paper board	40%	11%
264-000	Jute	40%	11%
276-390	Salt, bulk	Le3.30 a ton (table salt 15%)	Free
422-200	Palm oil	Free	20¢/gallon
422-800	Palm kernel oil	15%	40¢/gallon
561-190	Nitrate fertilizers	5%	Free
684-290	Aluminum	40%	11%
044-000	Maize unmilled	15%	50¢/100 lb.

Source: Tariffs of Sierra Leone and Liberia

ANNEX TABLE 4

LIBERIAN INDUSTRIAL PROJECTS
PLANNED AND IN PROGRESS AS OF APRIL, 1975

a) Projects in the realization stage (factory being built, machinery on order; some recently started production)

Number	ISIC Code No.	Description
1.	3118	sugar (Taiwan)
2.	3220	uniforms & garments (Mesurado)
3.	3311	rural industrial estates
4.	3511	wood products (MWPC)
5.	3311	wood seasoning (Metal)
6.	3311	wood seasoning (Jantzen)
7.	3412	paperboard box
8.	3560	polyurethane foam & products
9.	3811	agricultural and other tools*
10.	8310	Industrial Park of Monrovia
11.	3311	wood products (VANPLY)
12.	3320	furniture expansion (MIC)
13.	3523	detergent (Mesurado)
14.	3523	cosmetics
15.	3510	candles
16.	3410	notebooks and related products
17.	3840	trailer manufacturing
18.	3213	knitware
19.	3410	paper conversion plant

* Projects designated "Union Industries" of the Mano River Union.

b) Projects in the study stage (Feasibility Studies are being made or have been made and are being evaluated, finance sought, etc.)

Number	ISIC Code No.	Description
1.	3311	wood products (PPD)
2.	3311	wood products (LLPC)
3.	3311	wood products (Cestos Nimba)
4.	3311	wood products (Romania)
5.	3411	wood pulp
6.	3511, 3512	fertilizer and other chemicals
7.	3551	rubber goods*
8.	3559	rubber processing (2 or 3 plants)

ANNEX TABLE 4 (Cont.)

b) (Cont.)

Number	ISIC Code No.	Description
9.	3710	iron and steel
10.	3710	roofing sheet
11.	3839	light bulb*
12.	8310	Industrial Free Zone
13.	3240	leather shoes
14.	3560	briefcases and attachés
15.	3900	salt production (grinding, sacking only)

* Projects designated as "Union Industries" of the Mano River Union.

c) Projects in the inception stage (idea mooted, discussion started, etc.)

Number	ISIC Code No.	Description
1.	3113	citrus fruit processing
2.	3115	edible oil*
3.	3122	animal feed
4.	3122	cassava chips, pellets
5.	3610	porcelain goods
6.	3620	glass bottles*
7.	3620	quartz products
8.	3691	bricks
9.	3692	cement*
10.	3720	ilmenite and other rare metals
11.	3833	household electric appliances
12.	9310	polytechnic institute
13.	9320	industrial standard laboratory
14.	3560	crates and pellets
15.	3900	jute bags
16.	7110	dry dock/ship repair

* Projects designated as "Union Industries" of the Mano River Union.

ANNEX TABLE 5

LIBERIAN LIST OF MANUFACTURING PROJECTS
UNDER CONSTRUCTION OR PROPOSED,
1975

FOOD INDUSTRY

1. Liberia Sugar Corporation:

P.O. Box 9, Maryland Avenue
Harper, Cape Palmas.

Head Office
P.O. Box 436
Monrovia, LIBERIA

The sugar plant is under construction with Taiwan assistance.

2. Citrus Fruit Processing:

Citrus juice canning from imported juice essences. In a later stage citrus plantation will be set up. The Argentinian firm "David Hogg" discussed the project with the Ministry of Commerce, Industry and Transportation and promised to submit the feasibility study soon.

3. Meat Distribution Center:

Meat packing, canning and distribution. The project is expected to be based on local and imported meat from Argentina. The firm PAASA from Buenos Aires promised to submit a feasibility study soon.

4. Edible Oil Plant: (Edible Oil Margarine, Shortening)

This is a Mano River Union project. A pre-feasibility study is supposed to exist with the Ministry of Planning. A feasibility study is required.

5. Animal Feed Plant: (Various kinds of animal feeding stuff)

This is an additional project to an already existing plant of this kind. The project is supposed to be included in the 4-year plan. It will be necessary to investigate if any pre-feasibility study exists.

6. Cassava Chips Project:

This is a project which is supposed to be included in the 4-year plan.

7. Yoo-Hoo Liberian Corporation:

Chocolate and similar products.
c/o Mr. W. Shadzach Artis
Ducor International Hotel
Monrovia, LIBERIA

The study has been submitted to the Concession Secretariat and it is awaiting inductive approval. A copy of the study exists with the Ministry of Commerce, Industry and Transportation.

BEVERAGES

8. Monrovia Breweries:

Bushrod Island
P.O. Box 437
Monrovia, LIBERIA

Due to the increasing consumption of beer, expansion of the existing capacity is expected within the planned period.

9. United States Trading Corporation:

Coca Cola Plant
Congo Town
P.O. Box 140
Monrovia, LIBERIA

Relocation and expansion of the plant.

TEXTILE AND FOOTWEAR

10. Laden-Huntex Industries (Garments-Clothing)

Monrovia Industrial Park
P.O. Box 1510
Monrovia, LIBERIA

The factory is under construction. Incentives granted. Loan from LBIDI requested.

11. Mesurado Garment Corporation:

Bushrod Island
P.O. Box 142
Monrovia, LIBERIA

Incentives have been granted. Project has failed and is closing down.

12. Umbrella Assembly Plant:

This is an existing plant which is believed to have discontinued operation. Present position is not known to the Ministry of Commerce, but this should be clarified. An umbrella project seems to be feasible. Contact Mr. D. Sherman, West Africa Investment Corporation, Sinkor, Monrovia.

13. National Business Development Co. Ltd.:

Textile Division,
P.O. Box 1922
Monrovia, LIBERIA

This is an existing plant situated at Freeway. Twenty eight looms as well as the finishing department have been installed. The factory was designed to produce suiting cloths and/or blankets. After a trial, production was discontinued because incentives were not granted and the factory was not able to compete with imported cloth. The position should be made clear and assistance offered for reopening the plant.

14. West African Shoe and Rubber Industry:

P.O. Box 191
Monrovia, LIBERIA

The factory has discontinued operation. The position and possibility of reopening the plant should be clarified.

WOOD INDUSTRY

15. Liberia Metal Company:

Wood Seasoning Plant
P.O. Box 182
Monrovia, LIBERIA

Incentives have been granted. The factory seems to have been completed.

16. Jantzen Wood Seasoning Plant:

U.N. Drive
P.O. Box 300
Monrovia, LIBERIA

The factory is supposed to be under construction.

17. Vanply of Liberia Inc.:

Greenville, Sinoe
P.O. Box 1418
Monrovia, LIBERIA

The company is building a $30 million export plywood and veneer mill.

18. Togba Timber Corporation:

P.O. Box 1664
Monrovia, LIBERIA

A saw mill is under construction at Joe Town Forest, Grand Gedeh County.

19. P.D.P. Timber Industries:

P.O. Box 2050
Monrovia, LIBERIA

A saw mill is under construction.

20. SIGA Lumber Corporation:

Bushrod Island
P.O. Box 1318
Monrovia, LIBERIA

A saw mill is under construction.

21. Liberian Logging and Wood Processing Corporation:

Claratown
P.O. Box 326
Monrovia, LIBERIA

Loan approved by LBIDI. A saw mill is supposed to be under construction.

22. Cavalia Timber Company:

P.O. Box 2689
Monrovia, LIBERIA

A saw mill is under construction at Krah, Bassa National Forest, near Zwedru.

23. Monrovia Industrial Corporation (MIC)

Furniture Factory
Bushrod Island
Point Four
Monrovia, LIBERIA

The furniture factory is expanding capacity.

24. Wood Complex Project (Bomi Hills)

This is a Romanian government suggested project. Feasibility study exists with the planning ministry. Present position of the proposal is to be clarified.

PULP AND PAPER INDUSTRY

25. Wood Pulp for Paper:

A feasibility study exists somewhere. Whether or not a contract has been signed with any investor needs to be found out. Consult Ministry of Planning and LDC.

26. Junk River Corporation:

Paperboard Boxes Plant
P.O. Box 1472
Monrovia, LIBERIA

The factory is under construction. Progress Report Form dispatched on September 11, 1975.

27. Vaange Ahn Enterprise:

Paper conversion plant (toilet tissues and paper napkins). Incentives have been granted. More information is required from Mr. M. Burleigh Holder, Deputy Ministry of State for Presidential Affairs, Executive Mansion, Monrovia.

ANNEX TABLE 5 (Cont.)

CHEMICAL INDUSTRY

28. Liberian Allied Chemical Corporation: (Candles Factory)

Incentives have been granted. More information is required. Contact Mr. E. E. Saleeby (Sponsor), President of LBID, Monrovia.

29. Liberia Refining Company:

Gardinersville
P.O. Box 190
Monrovia, LIBERIA

The refinery is expanding capacity and storage facilities.

30. Mesurado Detergent Company:

P.O. Box 142
Monrovia, LIBERIA

Incentives have been granted. Only packing facilities exist. The company intends to import machinery and to start mixing detergent components.

31. Liberia General Industries:

U.N. Drive
P.O. Box 4593
Monrovia, LIBERIA

This is a cosmetic plant under construction. Incentives have been granted.

32. Vehicle Tires and Tubes Projects:

This is a Romanian government proposal. Feasibility study exists with the Ministry of Planning. The present position of the proposal is to be clarified through contact with the Rumanians.

33. Firestone Rubber Plantations Company:

Rubber Processing Plant

There is a plant under construction.

34. Liberian Rubber Processing Corporation:

Rubber Processing Plants
U.N. Drive
P.O. Box 1526
Monrovia, LIBERIA

Two plants are under construction. Loan amounting to $500,000.00 has been granted by LBIDI.

35. Agro-Chemical Industry:

Address and other information are not known to the Commerce Ministry. It seems to be a new project.

36. Burk Liberia Ltd.:

c/o Mr. A. Kassas
Broad Street
P.O. Box 432
Monrovia, LIBERIA

This is a pharmaceutical project. A study has been submitted to the Concession Secretariat. It is awaiting incentives approval.

37. Starling Products (Nigeria) Ltd:

P.O. Box 3199
Lagos, Nigeria

This is another pharmaceutical project proposal. A study has been submitted to the Concession Secretariat. It is hoped that only one of the two projects will be approved.

NON-METALLIC MINERAL PROJECTS

38. Glass Bottles Project:

This is a new identified project which seems to be feasible. A study is required. Contact LDC.

39. Products Based on Caolin:

This is a new probably feasible project. A study is required. Contact LDC.

40. Bricks and Roofing Tiles Project:

This is also a prospective project. A study is required. Contact LDC.

41. Cement Plant:

This is a Mano River Union project. A study is required. Contact the Ministry of Planning and LDC.

42. Liberia Cement Corporation:

Bushrod Island
Freeway
Monrovia, LIBERIA

It is assumed that the factory will expand during the 4-year plan period.

METAL AND ELECTRICAL INDUSTRY

43. Liberian Equipment Manufacturing Company:

Carey Street
Monrovia, LIBERIA

This is supposed to be a new project to establish a factory for agricultural and other tools. A loan from LBIDI has been sought. Contact the bank or Mr. W. Richards, Deputy Minister, Ministry of Public Works, Monrovia (sponsor)

44. Iron and Steel Project:

VOEST-ALPINE AG of Austria
P.O. Box 2
A-4010
Linz-Donau
Austria

An out of date study exists with the Commerce Ministry. A new study is under preparation by VOEST of Austria.

45. Monrovia Construction Company (MCC):

Jamaica Road
Bushrod Island

This is an already existing company which intends to set up a plant for nails, fence wires, etc. Galvanizing facilities for the production of plain and corrugated iron sheets are also foreseen. Loan granted by LBIDI. Also contact the bank.

46. Liberia Muffler Company:

Benson Street
P.O. Box 152
Monrovia, LIBERIA

The factory has begun a trial production of mufflers for a variety of passenger cars.

47. Tow Trailer, Inc.:

Manufacture of transport and cargo hauling trailers. This is a new company. Incentives have been granted. More information required. Contact Concession Secretariat and Mr. Alray Sumpter (sponsor), Ministry of Finance, third floor, Monrovia.

48. Vehicle Assembly Plant:

Besides the Romanian proposal it seems that another proposal from Argentina exists. Further information is required.

ANNEX A
CONTRACTOR'S PROFILE

PROFILE OF SANDERSON & PORTER, INC.

Founded in 1896, Sanderson & Porter is one of the oldest and most respected firms of international consultants in the United States. It is a firm identified with the profession of management consulting with special emphasis in the fields of investment feasibility, marketing, management advisory services, finance, organization and training. These services are performed both for world lending agencies and private industry. Consulting assignments have been executed throughout the Western Hemisphere, Middle East, Far East, and Africa.

Sanderson & Porter was founded as a partnership, and functioned in that manner until 1960, when it was incorporated. The worldwide staff of the firm numbers some 500 individuals.

Sanderson & Porter, Inc. is headquartered at 25 Broadway, New York, New York 10004, U.S.A. To serve clients the world over, Sanderson & Porter has the following subsidiaries and offices:

Wholly owned subsidiary:

SELTEC Engenharia Ltda.
Av. President Vargas, 435-2 Andar
Rio de Janeiro, GB, BRAZIL

Overseas offices:

London, England
Medan, Indonesia
Tehran, Iran
Ahwaz, Iran
Monrovia, Liberia
Maragua, Nicaragua
Dhahran, Saudi Arabia
Jeddah, Saudi Arabia

Sanderson & Porter is a member of the following Associations:

Association of Consulting Management Engineers
American Management Association
European Consortium of Management Consultants
National Constructors Association
American Indonesian Chamber of Commerce

The Company is divided into three major operating Divisions:

Management Consulting: This Division specializes in all phases of investment feasibility, management and organizational studies, marketing advisory services, agricultural analysis and agri-business programs. Using the most advanced and comprehensive methods, assignments are undertaken by a large staff whose members are recognized authorities in their various fields of endeavor.

Engineering: This Division provides complete technical services taking ful' responsibility for any type of engineering project. Emphasis over the years has been in the power generating, metallurgical and desalination fields.

Construction: This Division supervises the construction of major industrial and utility installations throughout the world.

Sanderson & Porter's engagements have been characterized by on-time performance and adherence to cost estimates which is made possible by our management's day-to-day involvement in each assignment.

STUDY TEAM PROFILES

NAME	STANTON R. SMITH Industrial Economist, Team Leader
EDUCATION	University of Washington (Honor Student), 1946-48, Economics University of California, Berkeley (Honor Student), Civil Engineering and Economics, B.A. Degree, 1949 University of California, Berkeley, Economics and Industrial Planning, M.A. Degree, 1951 University of Cambridge, England, Post Graduate Research, Industrial Planning, 1953-56
PROFESSIONAL RECOGNITION	American Economic Association American Statistical Association Society for International Development Contributor to "Consulting Engineer" and co-author Dams in Africa Lecturer, University of California, Berkeley, Business School, 1961-62 Lecturer, University of California, Los Angeles, Economics Dept., 1970-73

BACKGROUND

Twenty years of industrial development experience in North and South America, Africa and Asia as an industrial engineer-economist. International projects included project management of studies on industrial programming priority, feasibility, construction costs, and technical surveys for medium and large-scale industry including aluminum, cement, thermal and steel, hydro-electric and transportation systems. International industrial consulting developed from a background of professional training and experience as an industrial planning economist and construction engineer. Thorough working knowledge of current business, economic and political conditions throughout the world developed from working, visits and assignments in more than sixty countries.

Corporate executive experience includes: Chief Economist of Kaiser Engines, Kaiser Industries, Chief Economist of Martin Marietta Aluminum and Director of Corporate Planning and Development of Amax Aluminum.

NAME	WILLIAM A. HAMMOND **Marketing Advisor**
EDUCATION	Harvard College, A.B. Political Science - 1949. New York University, M.B.A. - Economics - 1963.
BACKGROUND	Twenty-five years of experience in all aspects of international program planning and research. Skilled in analyzing market trends; preparing short and long range economic forecasts; and evaluating foreign investment opportunities. Engaged in every phase of survey operations from field interviewing to presentation. Prepared demand and supply forecasts, general business forecasts, investment evaluations and specialized studies for multi-national firms. Planned preferable areas for investments in Europe, Latin America, Africa, the Near and Far East by preparing business outlooks in 47 countries. Investigaged production data, competitive energy sources, exploration laws, projected demand and supply, prices and distribution network. Advised on investment requirements, financing and sources, participation, taxation, remittance of dividends, profits and guarantees.

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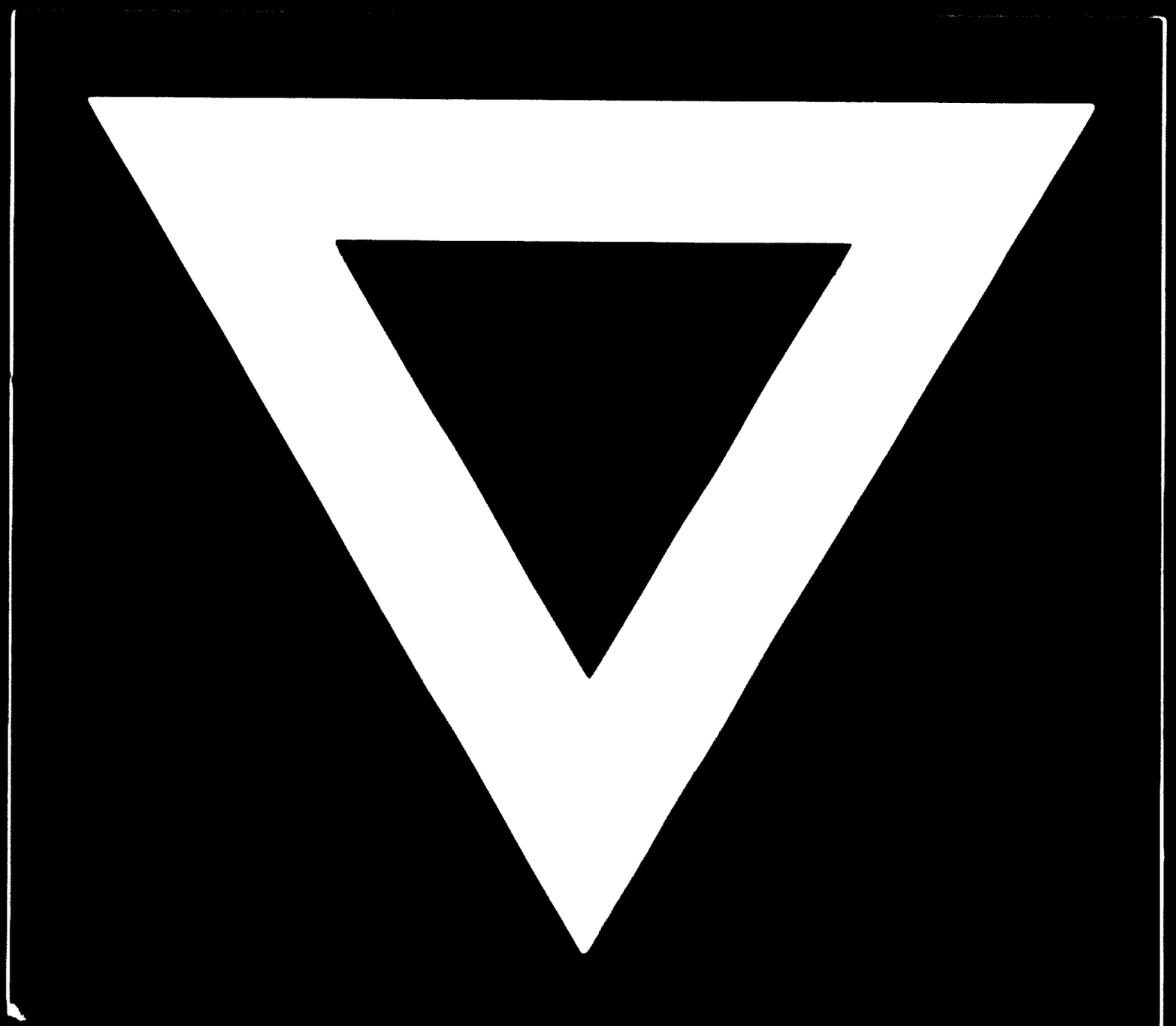

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