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MIRI - BINTULU

Working Papers
Association Papers
Memo's
Preliminary Report
Etc.,

M E M O O N F I N A N C I N G

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CONTENTS

CONTENTS PAGE

PART I: I N T R O D U C T I O N

1. THE SCOPE OF WORK

The Scope of Work for the Study directs the Consultants to "..... estimate (in order of magnitude) the overall financing requirements over the 20 year period, the generation of funds to be supplied from outside the area by official and private sources and relate these requirements to global macro-economic projections of the supply of funds in sarawak and Malaysia over the same period". Further it requests preparation of ".... detailed funding requirements for the six year period, for the public and the private sector ...." and ".... a feasible financial programme to meet the funding requirements".

The first part of this requirement was met by the Perspective Plan; the second part is under preparation in connection with out ACTION PROGRAMME. This Memorandum includes a few general notes on financing and a summary of three Working Papers dealing with organisation of internal sources for financing:

- LAND RENT;
- SARAWAK PEOPLE'S SAVINGS AND LOAN SOCIETY;
- PREMIUM BONDS.

2. GENERAL

In debates on development it is at times mentioned that lack of funds or of capital is a constraint on progress. Although such a statement can be correct, it does require further explanation.

What is needed for development is real resources, i.e. land, labour and plant; the latter including factories, equipment, means of transport, structures, etc. Some resources may be relatively scarce leading to constraints on development. The scarce resources may create 'bottle-necks' so that other available resources cannot be put to proper use. For instance scarcity of certain types of skilled manpower may be a constraint on employment of unskilled labour. The problem can be solved by training the available labour force adequately thus increasing the supply of the scarce factor.

Some production inputs may have to be imported, such as certain raw materials, specialised equipment and manpower. The 'bottle-neck' here may be an insufficient supply of foreign currency, which can be remedied by foreign loans.

Money in itself - whether termed funds or capital - is not a real resource, but a means of allocating resources to various purposes and of organising and promoting a certain level of economic - we could also say productive - activity. The higher the activity, the higher will be employment and income.

The Government influences both the level of activity and its distribution on various sectors of the economy through its collection of taxes and revenues of all kinds and its expenditures, whether recurrent or for development. By collecting revenues the Government absorbs purchasing power from the population; by paying expenses the Government creates jobs and incomes, which in turn are used for purchasing goods and services. By surplus budgeting the Government can exert a contractive, that is a reducing effect on the economic activity; by deficit budgeting a stimulating or expansive effect.

The accounts of public revenue and expenditure for a number of years, reveal a considerable net absorption of money by the public sector in the Study Area. Apparently this has been the accepted policy because a clear tendency to operate with surpluses on all budgets has been recorded during this period. These surpluses amount to an annual total of approximately 20 per cent of the total balance of all public budgets.

This policy, however, has recently been reconsidered on State level and a new attitude is emerging, for instance manifested by the Chief Minister in his Budget Speech on 6th March, 1972 to the Council Negri. The speech runs: "... with the increasing tempo in development and the need to provide services to the people in the State, it is most likely that we will continue to have deficit budgets during the next two or three years, assuming that our sources of revenue cannot be further

expanded.", and: ".... it is a false budgetary policy to restrict expenditures either development or recurrent in order to leave and possibly increase the surpluses we have been accumulating at the expense of restricting the kind of services demanded by the people." This indicates a more progressive way of using public finances as an instrument for accelerating economic development.

However such an approach is not without its dangers. If the economic activity is stimulated, 'bottle-necks' may soon appear with the effect that certain groups of people may be able to increase their income in-stead of their production. This may partly lead to unintended and unfavourable effects on income distribution ("the rich becomes richer, the poor poorer"), partly to uncontrolled inflation. It is therefore desirable for the Government to have at its disposal measures for a flexible absorbtion of purchasing power.

Equally important is to find ways for mobilising savings of private persons to be channelled into development of the Society. It is important to stimulate savings so that an increasing part of the National Income may be used for investments. In all layers of the population there is a need and a willingness to save in order to build up a certain security against adverse events. Where the money economy is less development or suspected - for instance because of inflation - considerable savings will take the shape of acquiring land or hoarding gold. It would be an advantage if savings could be based on money deposits and if these deposits could be as secure and stable as land and gold are considered to be.

The Three Working Papers summarised in this Memo contain proposals for measures which can contribute to a solution of the above mentioned problems and to several other problems arising in connection with the transformation of the more 'simple' societies into more 'complex' societies.

"LAND RENT" is dealt with in PART III, "SARAWAK PEOPLE'S SAVINGS AND LOAN SOCIETY" in PART IV and "PREMIUM BONDS" in PART V. The following - PART II - deals with the overall financial frames for the ACTION PROGRAMME 1975-1980 and the procedure of balancing financial requirements against financial possibilities.

PART II: THE OVERALL FINANCIAL PROBLEM

1. BALANCING FINANCIAL REQUIREMENTS AGAINST FINANCIAL POSSIBILITIES

The overall financial problem is to balance the financial requirements - originating from the desired development projects - and the financial potentials originating from internal and external sources. A procedure to facilitate this process is shown in Figure 1.1 on the next page. It shows a system consisting of 2 scales and a balance, the latter propped up or hung up in such a position, which just permits it's pans to touch the pans of the scales; i.e. the pointers of the scales remain on zero, when the two pans are at balance.

On one of the pans are put all project[1] recommended for implementation in the AP-period. Each project is given a weight according to it's financial requirement, $1 mn being for instance equal to 100 grammes. The projects are as shown aggregated into investment packages[2] according to their mutual dependency.

On the other pan are put the expected funds available for development, distributed after the sources of their origin. There are distinguished between:

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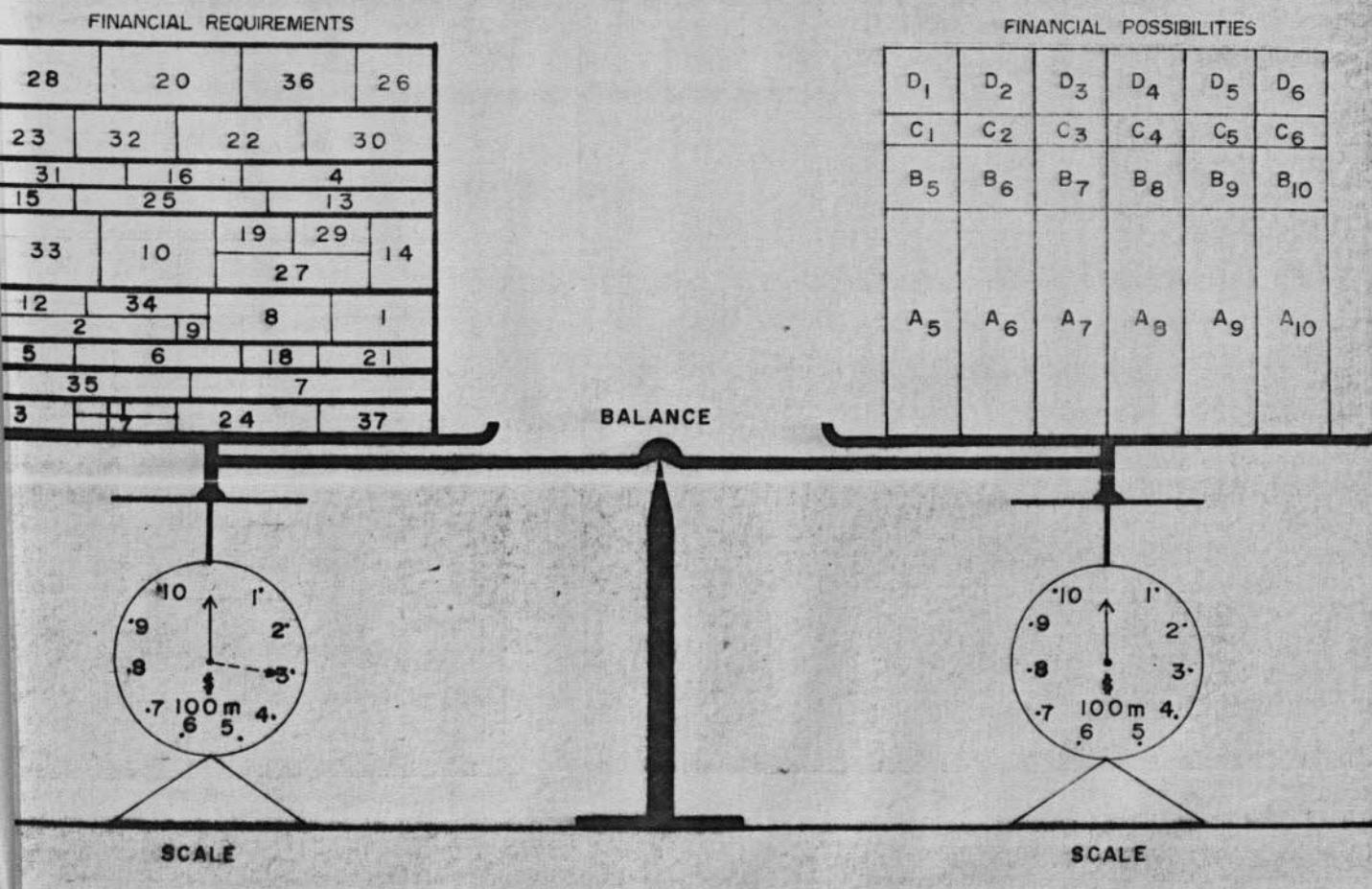
1) A 'project' is defined as a description of the smallest possible technical and functional unit, the implementation of which will influence the present state either by extending the bulk of activities or by reducing it.

2) The establishment of a new village is an example of an 'investment package'. The package would among other things include of housing projects, public service projects and road projects.

FIG. I.I

BALANCING FINANCIAL REQUIREMENTS AGAINST FINANCIAL POSSIBILITIES



Investment Package — — [ ]

Project No. 4 — — — — — — — — [4]

For purposes of weighting financial requirements/possibilities $1 Mn equals 100 grammes

Public Funds Available — — — — — — — — — — — — A

Private Savings Available — — — — — — — — — — B

Investments and Loans by Statutory Bodies — — — — — — — — — — — C

Foreign Investments and Loans — — — — — — — — D

The foot signs indicate the years; 5 being 1975, 6 1976 etc.

a) Public Funds Available; defined as the total amount of public revenues collected inside the Region (the Study Area), plus the net transfer of money to the Region from the State and Federal Governments[3];

b) Private Savings Available; defined as the total amount of private savings within the Region plus the net transfer of private savings to the Region from other parts of Malaysia;

c) Investments and Loans by Statutory bodies;

d) Foreign Investments and Loans.

Amounts invested and lent out by Statutory Bodies are included in the financial potentials to the extent that they correspond to the financial surplus of running activities of the Statutory Bodies and from loans and grants obtained outside the Region, but inside Malaysia. Foreign loans administered by Statutory Bodies are included in d).

It is most probable that the pan of the financial requirements will be the more heavy. The scale beneath this pan will then show the financial imbalance. As shown in the Figure the financial requirements might exceed the financial possibilities by $300 mn.

The decision-makers can then act in one or more of the following ways:

a) Increase the financial resources;
b) Reduce the number of investment packages;
c) Change the contents of one or more investment packages, either by removing some projects or by substituting some projects by others which are less good but cheaper.

In the following chapter the internal Malaysian funds used for development purposes within the Region in the years 1969 and 1970 are stated. In Chapter 3 crude estimated are made of the investment costs of the ACTION PROGRAMME and of the internal Malaysian funds available to meet these financial requirements.

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3) The 'net transfer of money to the Region' has so far usually been negative as money is absorbed by the State and Federal Governments for the payment of central administration and overall State and Federal purposes.

2. INTERNAL MALAYSIAN FUNDS USED FOR DEVELOPMENT PURPOSES WITHIN THE REGION 1969 and 1970

2.1 Public Funds Available (A)

In Table 2.1 are shown the total amounts collected within the Region by Federal, State and Local Governments in 1969 and 1970. The figures exclude oil and timber royalties.

TABLE 2.1 TOTAL AMOUNTS COLLECTED INSIDE THE REGION BY FEDERAL, STATE AND LOCAL GOVERNMENTS IN 1969 AND 1970. $ mn.

$ mn	1969	1970
Federal Government	12.4	13.1
State Government	18.3	16.8
Local Governments	0.8	1.0
Total	31.5	30.9

Nearly the same amount has been collected by the public in 1969 and 1970, namely a good $30 mn each year. The distribution between the Governments has changed a little from 1969 to 1970. Whether or not this change reflects a trend cannot be determined on the basis of the present information.

On the basis of the input-output matrix for 1970 presented in the Perspective Plan (page 161) the Gross Regional Product (GRP) has been calculated at $147 mn.[4] Then, the total amounts collected within the Region by Federal, State and Local Governments amounted to 21 per cent of the GRP in this year.

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4) This amount excludes the profit share but includes the local wage share of the gross product of the oil industry.

Table 2.2 states the expenditures of Federal, State and Local Governments in the Region 1969 and 1970. The expenditures are divided into ordinary and development expenditures. Ordinary expenditures are mainly of a recurrent nature while development expenditures are principally non-recurrent. Expenditures on the Police and the Armed Forces are not included.

TABLE 2.2 EXPENDITURES OF FEDERAL, STATE AND LOCAL GOVERNMENTS IN THE REGION 1969 AND 1970 DIVIDED INTO ORDINARY AND DEVELOPMENT EXPENDITURES. $ mn.

$ mn	1969			1970		
	Ordin.	Devel.	Total	Ordin.	Develop	Total
Federal Gov.	5.7	1.2	6.9	6.4	1.5	7.9
State Gov.	6.7	7.9	14.6	7.4	6.5	13.9
Local Gov.	3.3	0.3	3.6	3.5	0.3	3.8
Total	15.7	9.4	25.1	17.3	8.3	25.6
% of total	62%	38%	100%	68%	32%	100%

The total amounts - $25.1 mn in 1969 and $25.6 mn in 1970 - constitute what is defined above as 'public funds available'. Then, in these years there has been no net transfer of money from State and Federal Governments to the Region; on the contrary the Region has contributed $6.4 mn in 1969 and $5.3 mn in 1970 to State and Federal Governments - that is, the net transfer has been negative. This indicates that 80 per cent of the total amount collected within the Region remained in the Region in 1969 and 83 per cent in 1970. Note: Oil and timber royalties are not included.

2.2 Private Savings Available (B)

The private savings rate in the Region in 1970 can not accurately be stated, but on available evidence it has been estimated at 9 per cent of the GRP - equal to $13 mn. As the private investment rate

in 1970 is calculated at 5-6 per cent of the GRP - equal to $8 mn, the Region was a net exporter of capital to other regions of Malaysia and probably to other countries.

2.3 Investments and Loans by Statutory Bodies (C)

In Table 2.3 are shown the revenues and expenditures of Statutory Bodies within the Region in 1969 and 1970. The expenditures are divided into ordinary and development expenditures.

TABLE 2.3 REVENUES AND EXPENDITURES OF STATUTORY BODIES WITHIN THE REGION 1969 AND 1970. $ mn.

$ mn	1969			1970		
	Ord.	Dev.	Total	Ord.	Dev.	Total
Revenues			1.6			1.6
Expenditures	1.1	2.0	3.1	1.1	2.0	3.1
Ord. and dev. expenditures in percent of total	35%	65%	100%	35%	65%	100%

In 1969 and 1970 the Statutory Bodies spent twice as much money in the Region as they earned by their running activities in the area. The difference between expenditures and revenues constituted each year $1.5 mn. 65 percent of the total expenditures were used for development purposes.

3. FUTURE POSSIBLE SITUATIONS

Four alternative calculations of the total internal Malaysian Financial potentials available for the running activities and development of the Region in the period 1975-1980 are shown below.

The computations are based on the assumptions which lead to the state defined as Situation I in the Perspective Plan. The population growth rate of 4 per cent annually which characterises Situation I is considered most appropriate in the AP-period, first and foremost because the high rate of industrial growth, which is necessary to absorb a population growth above 4 per cent seems difficult to obtain in the early years of the planning period 1975-1990.

All results are stated in 1970 prices.

Common to the four calculations are the following assumptions:

a) 7 per cent increase per year of the GRP in the period 1970-1980[5)]

b) 8 per cent increase per year in the amount collected within the Region[6)] by Federal, State and Local Governments in the period 1970-1980.

   This indicates that the public year by year disposes of an increasing part of the GRP.

c) 6 per cent increase per year in the private consumption in the period 1970-1980.

   This indicates that the private consumption year by year decreases its share of the GRP. Assuming a population growth rate of 4 per cent, the yearly increase in private consumption per capita will amount to 2 per cent.

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5) The calculations behind the growth rate exclude the petro-chemical industry and extraction and treatment of crude oil.

6) Excluding oil and timber royalties.

d) 11 per cent increase per year in the private savings in the period 1970-1980.

e) 17 per cent increase per year in the internal Malaysian private savings available for investments inside the Region in the period 1970-1980.

This indicates that the Region as an investment area should become more and more attractive for domestic investors. In fact it is assumed that the gross transfer of private savings of the Region is counterbalanced in 1980 solely by the gross transfer of private savings from other regions of Malaysia to this Region.

f) 35 per cent of the public expenditures in the Region are development expenditures.

g) 65 per cent of the expenditures of Statutory Bodies in the Region are development expenditures.

The special assumptions for each alternative calculation are:

Alternative 1:

- the net transfer of money from State and Federal Governments to the Region is 0 in the period 1975-1980.
- the expenditures of Statutory Bodies within the Region increase by 10 per cent per year in the period 1970-1980.

Alternative 2:

- as alternative 1.
- the expenditures of Statutory Bodies within the Region increase by 20 per cent per year in the period 1970-1980.

Alternative 3:

- the net transfer of money from State and Federal Governments is negative, equal to 20 per cent of the public revenues within the Region in the period 1975-1980.
- as alternative 1.

Alternative 4:

- as alternative 3.
- as alternative 2.

The computations based on the above mentioned assumptions show that the total amount available for recurrent public activities and for public and private investments in the Region from internal Malaysian sources in the AP-period range from $470 mn to $570 mn according to the alternative chosen. The total amount available for development purposes range from $280 mn to $330 mn.

Below are shown crude estimates of investment costs originating from development projects envisaged by this Study to be carried through within the AP-period 1975-1980.

TABLE 3.1 CRUDE ESTIMATES OF INVESTMENT COSTS ORIGINATING FROM DEVELOPMENT PROJECTS ENVISAGE BY THIS STUDY TO BE CARRIED THROUGH DURING THE AP-PERIOD 1975-1980

Type of activity	Costs in $ mn	
Public utilities		72
- water supply	15	
- sewerage	23	
- electricity	18	
- telecom	10	
- drainaged misc.	6	
Public services and urban roads		72
Roads, bridges, airports and ports excl. a deep sea port		50
A deep sea port		50-100
Agriculture		78
- cost to bring agricultural activities into establishment	67	
- processing facilities	11	
Forestry & wood manufacturing		36
Other industries excl. petro-chemical industry and oil extraction and processing		20
Housing		73
Private services		35
Total		486-536

The estimate of the total development costs in the AP-period ranges from $490 mn to $540 mn, including the deep sea port but excluding the oil and petrochemical industry.

According to the computations carried through in this paper the financial requirements exceed the internal Malaysian financial possibilities by $160 mn to $260 mn.

However, it should be remembered that the possibilities of foreign direct investments and loans and a proper share of the timber and oil royalties have not been taken into consideration.

If, for instance the oil royalties are fixed at 8 per cent of the sales value and if oil and gas production is assumed to grow at a rate of 2 to 2.5 per cent annually, the accumulated oil royalties would be around $100 mn in the AP-period, provided of course the oil prices follow the trend envisaged in the late sixties and early seventies.

If timber royalties are supposed to be $20 per ton the accumulated timber royalties would be around $200 mn in the AP-period.

Although, the oil and timber royalties should be attached to the State or the Nation as a whole for development purposes and not to a limited area like the Study Area, it should be born in mind that the development of this Region is envisaged to absorb population from other parts of the State; the development here would thus be to the benefit of the whole of Sarawak.

According to our population forecast assumptions the in-migrants to the Region constitute 35 per cent of the total population growth in the Region in the period 1970/80 and 55 per cent in the period 1980/90. If the whole period 1970/90 is considered the in-migrants constitute a good 45 per cent of the total growth.

Should the development costs in the AP-period be related to 'migrants' and 'locals' respectively we get the following results.

TABLE 3.2 DEVELOPMENT COSTS IN THE AP-PERIOD RELATED TO MIGRANTS AND LOCALS RESPECTIVELY

In-migrants in percentage of the total population growth	Development costs in $ mn accruing to:	
	'migrants'	'locals'
35%	70-190	300-370
45%	220-240	250-320

The reason for using the in-migration ratio of 45 per cent is that some of the development costs in the 1975-80 period will facilitate the accelerated development after 1980.

In fact the figures show that the amounts calculated as being available for development purposes from 'internal Malaysian sources' - ranging from $280 mn to $330 mn - correspond rather closely to the proportion, which could be allocated to the 'local' population growth.

PART III: L A N D R E N T

1. ORIGINATION OF THE LAND RENT IDEA

In considering the possible sources of finance available for the agricultural development of State lands, one solution examined was the imposition of a flexible Land Rent System, which is summarised below. It is appreciated that such a system would necessitate amendment to present land policy, and touching as it does upon the fundamental principles of Government, would normally be considered outside the scope of a Regional Planning study. However, consideration of this system gave answers to many other problems met in formulating our planning ideas, and it was therefore decided that this solution - in outline, should at least be brought to Government's notice.

2. ALIENATION OF STATE LAND UNDER THE PRESENT LAND CODE

The Sarawakian Land Code is based on the principle that all land in Sarawak belongs to the State. Nobody can obtain proper ownership in the traditional sense of 'ownership' but it is possible to lease land from the State in a certain Term of years by paying a Premium when the land is alienated, and a yearly Rent in the lease period. However, in practice Native Customary Land constitutes an exception. Practically it is treated as belonging to the Natives in question, but as soon as areas of Native Customary Land change status to Native Area Land, or Mixed Zone Land, thus being surveyed and recorded by the Land and Survey Department, the State formally takes over the basic ownership of the land. This is expressed by the fact that continued occupation of the land is based on a lease contract.

The Term of lease may vary according to the use of the land, but normally it is either 60 years or 99 years. Within the lease period the leaseholder (with a few exceptions) is allowed to sell the land to a third party at the price he can get in the market. When the lease expires it is the present policy to renew it at the request of the former registered leaseholder. A new Premium has then to be paid,

but in the re-alienation situation it never exceeds 25 per cent of the market value. Like the Term of lease the Rent too varies according to the use of the land, but the amounts paid are only of a nominal order. The rates of Rent are adjusted at 10-15 years interval.

When unimproved State Land is alienated for agricultural purposes the lease period is normally 60 years; the Premium to be paid is $3 per acre and the Rent payable once a year at the rate of 20 cents per acre for padi cultivation and $1 per acre for land used for any other agricultural purpose.

The conditions for alienation of land belonging to and improved by the State are not covered in the provisions of the Land Code and apparently there is no current practice for this situation. However, the determination of the lease term and yearly Rent could be the same as for unimproved State land, but additionally, the Premium payable might be assessed relative to the cost of services such as roads, water and electricity supplies etc, provided by Government, subject to certain limits. For example equal to either the market value, alienating the land by tender, or the development costs of the land - provided that this sum does not exceed the market value - selecting the leaseholders according to certain criterias.

3. THE FINANCIAL PROBLEMS OCCURING FROM THE PRESENT LAND ALIENATION SYSTEM

In case of alienation of improved State Land the payment of the Premium must be based on a payment schedule as the leaseholder usually would have no capital for direct payment. The schedule should secure the re-payment of the Premium and payment of interest over a number of years.

As mentioned above the Premium could be assessed in various ways. On a non-subsidy basis it should cover the development costs (clearing, planting, infrastructure) and an assessed value of the land as such.

By applying a fixed amount in Premium the risks and chances of future cost and price changes would be carried wholly by the leaseholder. A price decrease would affect him adversely as he has to pay his annual installment rates at a fixed amount. A price increase would give him a profit, which would be capitalised in the shape of a higher sales price for his land, thus increasing the burden of his successor. In case of extreme reductions of crop prices the State would most likely have to give individual subsidies as leaseholders would be heavily burdened by repayments. In case of price increases it might be necessary for the State to support, at least temporarily, those farmers who have to takeover holdings at increased sales prices.

4. A SOLUTION OF THE FINANCIAL PROBLEMS OUTLINED IN CHAPTER 3.

Land which is owned by and has been developed by the State should be handed over to individual persons free of charge for productive use only, thus providing the leaseholder with a "usufructuary right", which gives him a right to stay on the land, to cultivate it and to keep the output for himself, apart from the Land Rent.

The output obtained from cultivating the land, then, would have to cover the following:

a) payment for various material inputs such as seed, fertiliser, tools and transport;
b) payment for labour inputs provided by the farmer, his family and possible hired labour;
c) payment for the service of the land as developed by the State.

The latter part should be transferred to the State in the shape of Land Rent, while the two former should be allotted to the farmer. As the Land Rent should be the same for units of land of same quality leaving the "standard farmer" a reasonable income for the work done on the land, the farmer who has a skill, an efficiency and energy above the "standard farmer" will earn a larger amount corresponding to his better farming.

The advantage of this system is, that the Land Rent could be periodically - for instance annually - adjusted to the development of prices of the main crops and to the general economic development of the Society. In this way the connection between the costs of providing the developed land and the payment for the land would be cut; instead a connection would be established between the payment for the land and the value of the production originating from this land. In fact this system would imply that "Sarawak is rich when production prices are high - and poor when they are low", while the present Premium System would imply that "the farmers are rich when prices are high - and poor when they are low".

An example may clarify this situation:
A "standard" rubber growing farmer has in year 1 a total output from the land equal to $3 000 (the value of the yield from the rubber trees), and in year 2 - because of price reductions on rubber - a total output equal to $2 700. His costs for materials, equipment, etc., in both years equal to $300 and the reasonable earnings for his and his family's work on the land are evaluated to $2 200 in year 1 and $2 300 in year 2. The $100 increase in year 2 is due to the general increase in the real wages in the Society from year 1 to year 2. The Land Rent corresponding to the value of the services of the land should then be $3 000 less $300 less $2 200 equal to $500 in year 1 and $2 700 less $300 less $2 300 equal to $100 in year 2.

The Land Rent will as shown fluctuate with the world market and local market prices of the produce growing on the land, thus reducing or removing any rigidity in payment terms, which in periods of very low prices might lead to specially established release provisions. In other words the system secures the farmer a stable income in defiance of price fluctuations. This quality of the system would render superfluous price stabilisation or price equalisation schemes, which have proved very difficult to handle.

5. DIRECT CONSEQUENCES OF THE PROPOSED LAND RENT SYSTEM

The "usufructuary right" of the leaseholder does not include the right to dispose of land by selling it to a third party. The land belongs to the State and the State will decide who is to take over the land when the former leaseholder wants to dispose of it. However, the "usufructuary right" of the leaseholder should include the right to leave by will the land to his intestate successors on similar conditions as he enjoyed himself. In cases where the leaseholder wants to move away from the land, but a member of his household wants to stay, the member in question should have the option to take over the land provided he meets certain criteria.

As the leaseholder cannot transfer the land to other than the State, with the exception of the special cases mentioned, it should be obligatory for the State to buy his real property (residential house, store buildings, houses and sheds for livestock, etc.) when he wants to dispose of the land and move. The price should be assessed by impartial persons and should be of a size which enables the seller to buy real property of the same standard elsewhere in the country. The evaluation should be based on some fixed criteria such as floor space, building materials used, technical and sanitary installations, age, standard of maintenance, etc.

If the leaseholder has improved the land (drainage, irrigation, travelling, terassing, etc.) he should be paid a bonus from the State. On the other hand if the land had deteriorated due to negligence by the leaseholder a damage payment should be claimed from him.

Native Customary Land and State Land already alienated are land held by individual persons or groups of persons. Some have paid a Premium for the land while others without payment have a prescriptive right to the land.

The present value of these areas of land is rightly looked upon by the occupiers as their lawful property. Encroaching on these values without compensation would be confiscation of private property and as such incompatible with the Constitution. This value must therefore stay untouched as private property. However, future increases in this value due to the

development of the Society could legally be absorbed by the Government through an Incremental Land Value Rent.

To state the land values "today", i.e. the date from which a revised Land Code could come into effect, all Native Customary Land and State Land already alienated should be assessed by the Land and Survey Department.

After the assessment the Land Rent System, which has been outlined for State Land, could in principle be imposed on Native Customary Land and State Land already alienated. The amount claimed as Land Rent should have a size which would keep the market value constant[7] equal to the assessed value. If the occupier wants to transfer the land, he can only do so to the special Lands and Survey office which administers the distribution of land and the buying and selling of real property. As in the case of State Land the occupier gets an amount, fixed by impartial persons, for his real property, but, beyond this he is also paid an amount for the land equal to the assessed value, index regulated.

If the economic possibility is present the Government can choose not to resell land bought from private persons, but give it status as original State Land and pass it on on a pure Land Rent basis.

6. ADDITIONAL CONSEQUENCES OF THE PROPOSED LAND RENT SYSTEM

1) As no land would be traded directly among private persons, but always with the State as the intermediary, the System will effectively prevent speculation in land.

2) For land used for farming the System would allow the "standard farmer" to earn a reasonable amount for himself and his family in defiance of fluctuations in crop prices. In fact, the income

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7) By constant is here meant constant in real terms, as the assessed land values should be index regulated to secure the occupiers against inflation.

of the "standard farmer" should be of a size which makes it competitive to the earnings which can be obtained by corresponding work in town. By reducing the gap between the incomes obtainable in the rural and in the urban areas the System would contribute to the reduction of urban migration.

3) As the System implies that an initial sum is not claimed from the leaseholder when land is alienated to him, future liquidity problems in connection with re-alienation of land from one person to another will be avoided. The new leaseholder will simply take over the obligation to pay the annual Land Rent.

4) The System would render superfluous the provisions of lease terms. There is no economic reason for limited terms, when land speculation is made impossible. Neither are they necessary as a means for the Government to acquire land. The present rather comprehensive provisions of resumption of land to the State would be sufficient to secure for Government the land which is needed for public purposes.

5) The System will allow a considerable flexibility in the resource allocation of the Society. Firstly because the mobility of the population will increase, as the collection of all information in connexion with the supply and demand of land and real property by one authority - the Land and Survey Department - will give the population a quick and clear picture of the available possibilities for acquiring land for agriculture, residential housing, industries, etc; Secondly , because the Government can impose Rent on land in accordance with its most appropriate utilisation,'proper land use'. The latter means that the Government could turn the productive use of the land, so that a maximum output could be ensured to the simultaneous benefit to the users and the Society.

6) The System would help in the selection of farmers, as persons who were not able to produce the surplus necessary to pay the Land Rent would have to give up the land, which could then be utilised by more able persons.

7) The System constitutes a tool, which would enable Government to influence rather effectively the distribution of land between different ethnic groups and classes of population in the State, thus avoiding any adverse social effects from restricted access to land.

8) The Land Rent would at the same time assure that farmers taking over State Land were not unduly benefitted at the expense of the rest of the Society and that they, within their ability, would contribute to payment for the services of the land they use and for the investments undertaken by the State in improvement of the land. In this way the farmers would also contribute to the recurrent revenues of the State and thus to a continuous development of the State.

9) The System would in time contribute essentially to the public revenues. It could be one of the main measures to overcome the future financial problems of the State Government envisaged in the MID-TERM REVIEW of the SECOND MALAYSIA PLAN. Also it could be considered an appropriate arrangement by international financing organisations as an economic basis for their lending.

7. FINAL REMARKS

The Land Rent System outlined above seems to give positive answers and solutions to social, ethnic, financial and political problems. In the present paper we have not dealt with the implementation of the System but it appears that much of the information necessary for its implementation and operation is already available. Further information will automatically be produced through the rational development of modern agriculture, (confer several papers on agricultural development).

Finally, the System could be efficiently adapted to electronic processing, thus reducing the administrative work to a minimum.

PART IV: S A R A W A K P E O P L E'S S A V I N G S A N D L O A N S O C I E T Y

1. THE IDEA BEHIND THE "SOCIETY"

SARAWAK PEOPLE'S SAVINGS AND LOAN SOCIETY is meant as one of the means to increase the propensity to save in the State - that is, to mobilize the savings of private persons. It should not be established as a direct competitor to the existing savings and credit institutions, but as far as possible fill out missing functions within this activity.

In order to attract savings the "Society" puts emphasis on meeting the demands of most depositors. These demands could be:

a) nearness of the savings institution to the savers;
b) maintenance or increase of the real value of the amount saved;
c) guarantee to the savers against losses encountered by the investment of the amounts deposited;
d) knowledge of and influence on how the saved money is invested.

2. NEARNESS OF THE SAVINGS INSTITUTION TO THE SAVERS

At present there are savings institutions and banking facilities only in the major towns of Sarawak. This means that a lot of people are not able to make regular use of this kind of service in their economic activity.

To overcome this disadvantage the whole State should be divided into "savings districts" and a local branch of the "Society" should be placed within each district. A centre of population and trade and its catchment area would most often constitute one "savings district".

In order to reach every person in the "savings district" and serve him regularly all the branches should have a bus and/or a boat at their disposal. These "savings buses" or "savings boats" should be specially designed for the purpose and work in the districts at fixed schedules.

Figure 2.1 shows how the Study Area could be divided into a number of "savings districts".

3. MAINTENANCE OR INCREASE OF THE REAL VALUE OF MONEY DEPOSITS AND GUARANTEE AGAINST LOSSES

Considerable savings take the shape of acquiring land and real estates or hoarding gold, because these subjects are supposed to be of stable value.

If it is the aim to increase the amount of savings based on money deposits, the creation of a stable value image for this kind of savings would therefore be a crucial point.

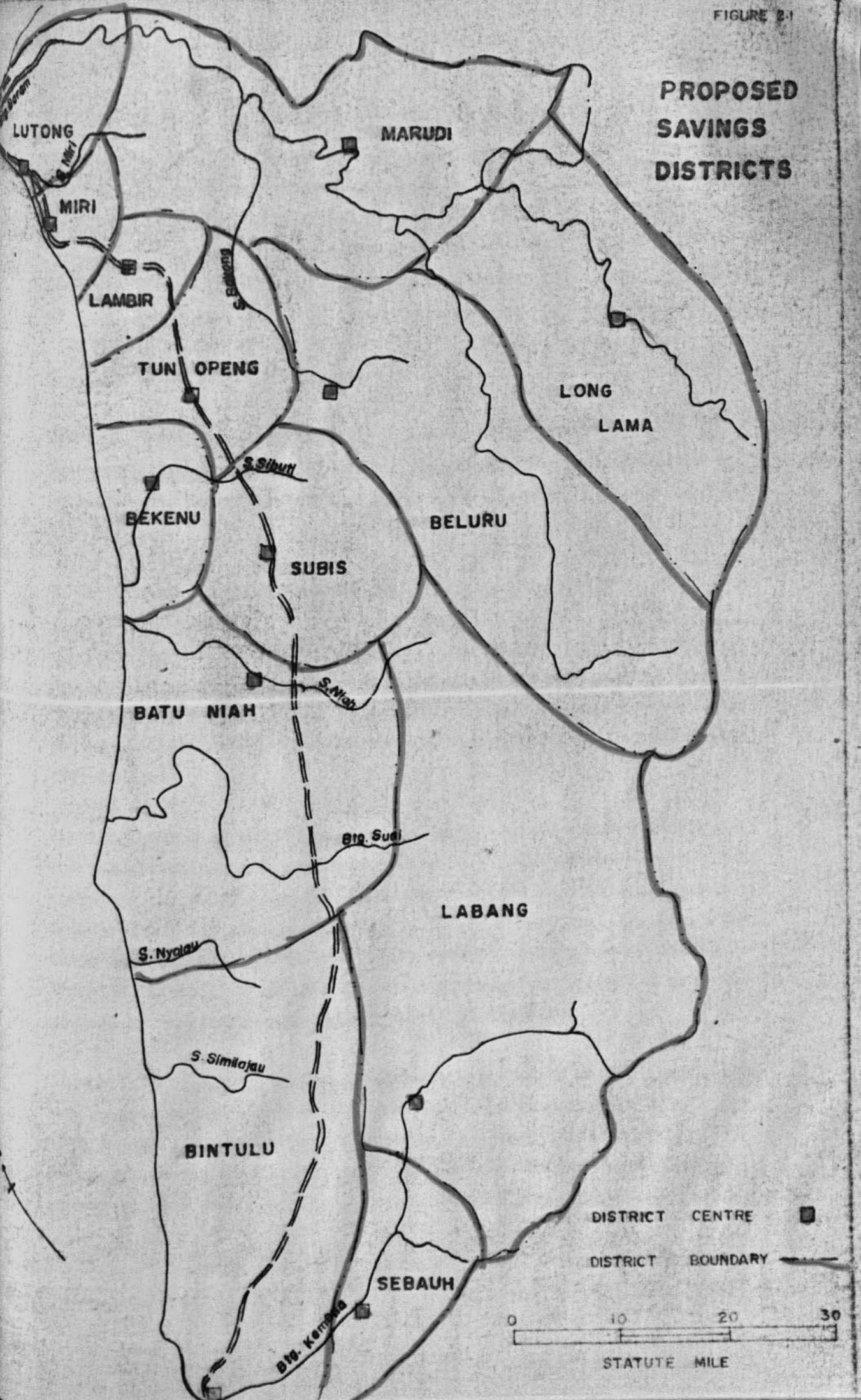
Securing of the real value of money deposits could be obtained by some kind of price based index regulation of the amount saved. Index regulation implies that the savings maintain their purchasing power over time - that is, keep their value measured in real terms. If for instance the index increases by 3 per cent a year, the deposits would be regulated accordingly, which means that they too would be increased by 3 per cent a year. In other words the index regulation means that it would be possible to buy the same quantity of commodities for the amount saved in the future as the day when it was deposited, in defiance of price increases on commodities and services.

In addition to the index regulation of the sum deposited it should of course also be attributed an annual interest. But as the real value of the deposit has already been secured by the index regulation the savers interest requirement would be lower than under traditional savings systems.

Guarantee against losses encountered by the investment of the amounts deposited may be based on:

a) the provision of a surplus on lending activities of the "Society" to be collected in a central guarantee fund;
b) a general guarantee given by the Government.

FIGURE 2-1


PROPOSED SAVINGS DISTRICTS
LUTONG
S. Miri
MIRI
LAMBIR
S. Baliungan
MARUDI
TUN OPENG
S. Sibuti
LONG LAMA
BEKENU
SUBIS
BELURU
S. Miah
BATU NIAH
Btg. Sudi
LABANG
S. Nyalau
S. Similajau
BINTULU
SEBAUH
Btg. Kemena
DISTRICT CENTRE
DISTRICT BOUNDARY
0 10 20 30
STATUTE MILE

4. KNOWLEDGE OF AND INFLUENCE ON HOW THE SAVED MONEY IS INVESTED

In order to educate people and make them familiar with banking business they should participate to a certain degree in the guidance of the "Society".

This could be effected, for instance, by establishing a General Assembly on local level consisting of those depositors in a "savings district" who have been a member of the "Society" for a certain length of time and saved a certain amount of money.

The tasks of the General Assembly could be to follow the savings and loan activity of the local "Socity" branch and to work out recommendations for the operation and management of the branch.

5. STRUCTURAL FRAMEWORK FOR THE ACTIVITIES OF THE "SOCIETY"

5.1 Deposit

One of the really important reasons why an arrangement such as the "Society" might increase the propensity to save is the growing need of the population for stable value savings to meet sickness, unemployment and old age.

The development of the Sarawakian community towards a modern urbanised and industrialised society means that more and more people are going to move from the rural areas to urban areas to work as salaried personnel. This movement may result in a changed family structure. The family will often be scattered and the old family security system within which, disabled, unemployed and old persons are nursed and supported by other members of the family may to some extent be dissolved.

Of course this development will increase the need of the individual person to save money, and the "Society" should be organised in such a way, that it would be the natural insitution for this kind of savings. The "Society" should specialise in accumulated savings for pre-determined purposes, such as savings for a house, for old age pension, for education

and for sickness and unemployment.

The savings arrangements might not only include individual persons but also public and private undertakings which want to set up savings and/or insurance schemes for their workers and employees.

5.2 Loan

Another aspect of the "Society" is its lending activity. The "Society" has the possibility to create low interest long term credit. This kind of credit will in any respect be sound for the development of the State. It will extend the pay back period of investments and thus lower the burden of debt servicing, whereby more stable business conditions are created. The need for low interest long term credit is already present and there are few possibilities of obtaining such loans.

The principal of the loan should be index-regulated to meet the corresponding requirements of the depositors.

The local "Societies" should first and foremost lend money for local activities, but also joint ventures between two or more local "Societies" in order to finance larger non-local activities would be a natural business.

A close co-ordination with the Agricultural Development Units (ADU's) would be desirable as regards both the savings and the loan activities.

PART V: P R E M I U M B O N D S

1. INTRODUCTION

Within the society and the Government there may be several different opinions about gambling. Some may accept gambling provided it will not expand into a hazard; others find that gambling is immoral, harmful to the people and waste of money, and therefore should be fought. Others again consider, that when gambling is a fact and probably will continue to be so, an attempt should be made to canalize some of the money used on this kind of activity into reasonable purposes.

If the latter attitude is predominant, it might be proper to look for a system, which could absorb some of the gambling money and canalize the amount into the courses wanted.

One such system is introduced in this paper under the heading "Premium Bonds". Premium Bonds are securities, being bonds and lottery tickets at the same time, combining the characteristics of both. Like ordinary bonds they may be transferable, interest yielding and redeemable after a certain number of years, and like ordinary lottery tickets they give the owners the chance of winning a prize.

By introducing this system it is hoped to increase the propensity to save by moving money from ordinary gambling, i.e. consumption, to Premium Bonds, which are a kind of savings. The savings thus obtained should be lent for development purposes.

In the following paragraphs a short description of the Premium Bond idea is given together with a few recommendations on how to handle it.

2. THE PREMIUM BOND SYSTEM

The pool of gambling is naturally paid by the gamblers themselves, and, as the bonds are redeemed at par after a certain number of years, the stake must be a smaller or bigger part of the interest yield obtained by lending the money procured by the sale of bonds. The bigger the part of the interest used on gambling will be, the bigger naturally the prizes can be. Most often the whole amount of interest, all administrative expenses deducted, is used as stake.

The system may then be as follows:

a) Premium Bonds are issued every half year up to an amount which covers the demand. The Bonds are sold at par.

   The demand will probably fluctuate over time, being high just before a drawing and low just after. To turn the high demand to account and to prevent that this demand results in surplus quotation on the Bonds at the free market, the half yearly issue should take place in the months just before a drawing.

b) All the Bonds may have the same denomination, e.g. $10.
c) The term of the Bonds may for instance be 10 years, after which they are redeemed at par.
d) Interests may be paid twice a year, but instead of being distributed proportionately, it is pooled and divided into prizes, which are drawn every half year.
e) The Bonds are not bearer securities and may be freely transferable.

3. THE APPLICATION OF THE ACCRUED CAPITAL

As in the case of "Sarawak People's Savings and Loan Society", the capital accrued may be used for development purposes. Statutory bodies as Sarawak Land Development Board, Sarawak Economic Development Corporation and Borneo Development Corporation, other development organisations, local councils and local associations with common purposes may be the main absorbers of the Premium Bond money.

To avoid the building up of a new big credit institution the money should be handed over to the organisations mentioned above on fixed conditions as regards the size of the interest and the redemption period. They might lend the money or use it themselves as they like within certain specified fields. The only requirement would be that they realize, when they use Premium Bond money and keep special accounts for it.

4. THE ADMINISTRATION OF THE ARRANGEMENT

The system has to be administered entirely by the Public Sector. State Financial Secretary (SFS) could be the administrative core of the arrangement, issuing the Bonds and managing the drawings.

The sale of Bonds can take place from any Public office and also banks, stockbroker's offices, local "Society" offices, etc. can be used.

A special office set up under SFS could administer the account between the Premium Bond fund and the development organisations in question.

FHA/ml
10.12.1973.

MB/3/Reg Plan

S. Jorgensen
5/12/73

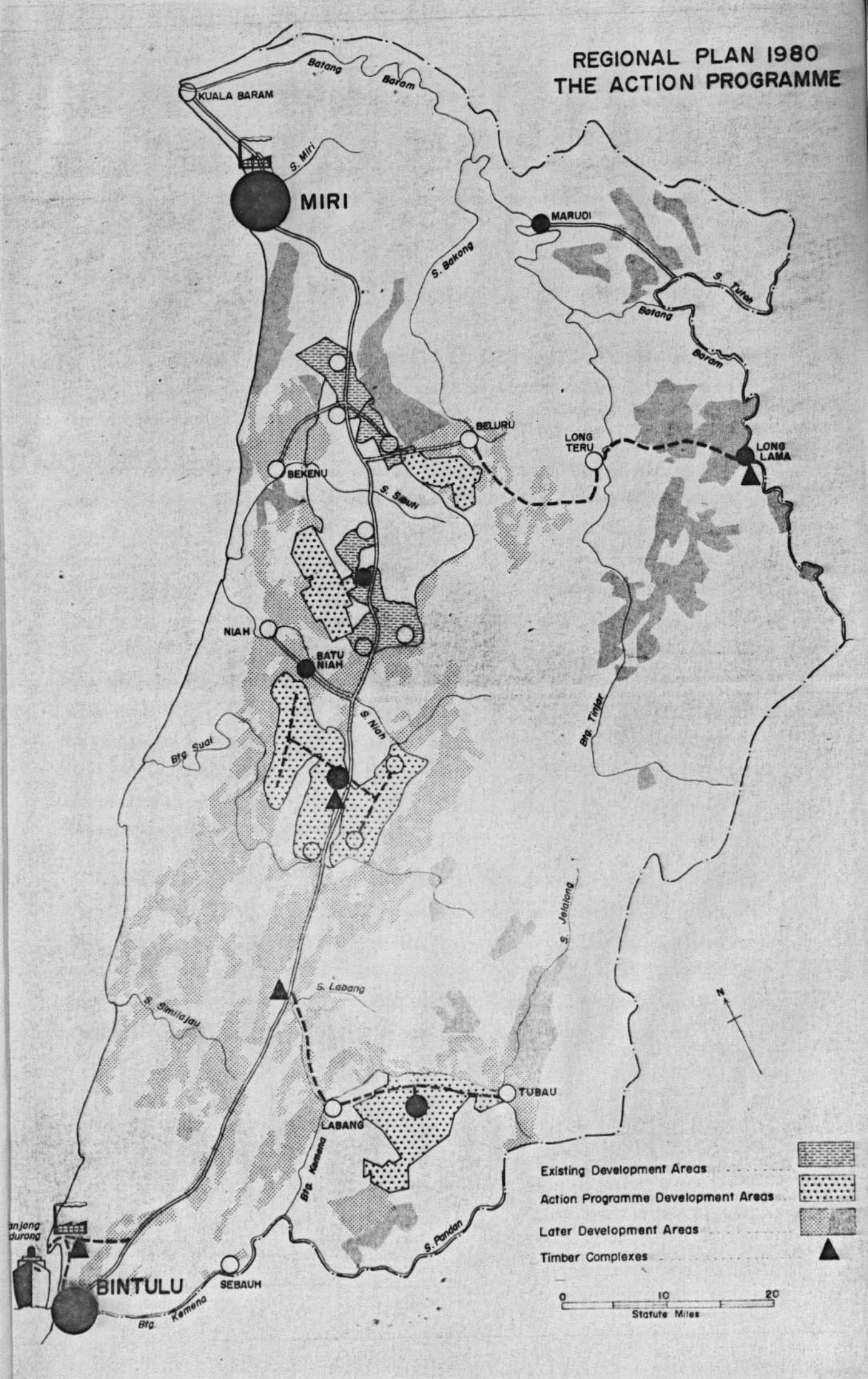
MEMO
ON
REGIONAL ASPECTS OF THE ACTION PROGRAMME

1. INTRODUCTION

This Memordandum outlines in simplified terms the recommended regional development of the Study Area during the period 1975 to 1980, that is, the ACTION PROGRAMME period. The outline of the regional aspects of development has been kept concise in order to give to the reader a quick and first introduction to the envisaged growth.

The recommended regional settlement structure of the Study Area by 1980, resulting from geographical characteristics of the territory and from considerations of developments in agriculture, forestry, industry, transport, public and private services, is shown diagrammatically on the Action-Programme/Regional Plan Map (Figure 1).

In general the development is envisaged as continued growth of industries and services in Miri; new major industrial and transport investments in Bintulu; completion of the existing agricultural schemes and opening up of new land for agriculture in the Lambir-Subis Development Area, and large scale agricultural developments in the Niah-Suai Area based on the plans of the present Study. Along the Miri-Bintulu road from the Suai river to Bintulu three new timber complexes are expected to be established under the auspices of the Sarawak Timber Development Corporation. In addition further growth and improvements of the existing agriculture on already occupied land and continued logging to supply existing sawmills and for export are envisaged.


REGIONAL PLAN 1980
THE ACTION PROGRAMME
KUALA BARAM
Batang Baram
S. Miri
MIRI
MARUDI
S. Bakong
S. Tutoh
Batang Baram
BELURU
LONG TERU
LONG LAMA
BEKENU
S. Sibuti
NIAH
BATU NIAH
S. Niah
Btg. Suai
Btg. Tinjar
S. Jelalong
S. Labang
S. Similajau
TUBAU
LABANG
Btg. Kemena
S. Pandan
BINTULU
SEBAUH
Btg. Kemena
Existing Development Areas
Action Programme Development Areas
Later Development Areas
Timber Complexes
0 10 20
Statute Miles

2. POPULATION GROWTH

The new developments and growth of existing industries are estimated to accommodate an increase in the population of four percent annually, which corresponds to the following population figures:

1970:	115 000
1975:	140 000
1980:	170 000

A population of 170 000 people in 1980 implies that about 18 000 people from outside the Study Area could be accommodated in the area during the period 1970 to 1980.

As mentioned in the Introduction the character of the growth of the Study Area up to 1980 points towards a higher degree of urbanisation of the area. The number of people living in urban and semi-urban areas is envisaged to grow from about 40 000 in 1970 to 75 000 people in 1980, corresponding to about 43 percent of the total population that year. It should be noted that the urban population would not include people living in new agricultural villages, as for example the existing and planned villages in the Lambir-Subis Development Area and those planned for the Niah-Suai Area. An exception from this is the village in Ladang Tiga, which could be envisaged as the main service centre for the people in the southern part of the Lambir-Subis Development Area. In the Niah-Suai Area three agricultural villages of about 2 000 people each would be established during the ACTION PROGRAMME Period.

The 1980 target population for the Regional Centres, for existing rural Service Centres and for new agricultural settlements is shown in Table 1. The settlement pattern in the Lambir-Subis Development Area is similar to the one proposed by SLDB. The Consultants have in working papers, and at meetings proposed a different settlement pattern for this area. However, these proposals have not been accepted by SLDB.

TABLE 1 TARGET POPULATION 1980 FOR EXISTING AND NEW SETTLEMENTS

Year	Miri	Bintulu	Batu Niah	Niah	Beluru	Bekenu	Sebauh	Labang	Tubau	Long Lama	Marudi
1970	27 000	6 000	1 000	1 000	500	700	700	500	300	600	4 000
1975	33 000	8 500	1 500	1 100	700	1 000	900	600	400	800	4 400
1980	40 000	15 000	2 200	1 300	1 500	1 500	1 200	1 700	500	2 500	5 000

Year	Kuala Baram	Bukit Peninjau	Tun Openg Bazaar	SOP Village	Sungai Tangit Village	Ladang Tiga	Subis I Village	Subis II Village	Sub Regional Centre in the Niah-Suai Area	Agric. Villages (3) in the Niah-Suai Area	Service Centre between Tubau and Labang
1970	600	0	0	0	0	0	0	0	0	0	0
1975	800	1 500	100	2 500	1 000	500	500	-	0	0	0
1980	1 000	2 500	300	2 500	1 500	2 500	2 000	2 000	5 000	2 000	2 000

3. DEVELOPMENT POTENTIALS

The target population figures are based on an evaluation of the following development potentials:

MIRI

- continued industrial growth mainly based on an increase in oil production and allied industries and the sustained growth of existing types of industries in the most important industrial centre of the Study Area.
- growth of the public and private service sectors as a result of the growing population in its catchment area.
- expansion and intensification of market gardening and livestock industries in and around the town.

BINTULU

- the establishment of major industrial enterprises and transport facilities including an LNG-Plant, a Timber Complex, a glass factory, an industrial estate for various industries, and a deep water port.
- major expansion in the public services, among others as a result of Bintulu being appointed a Divisional Centre and of the establishment of a new university.
- forest and agricultural developments in its catchment area.
- private services attracted by the port and the generally increasing importance of the town.

LAMBIR-SUBIS DEVELOPMENT AREA

- the harvesting of about 40 000 acres of oil palm and its processing in two oil palm mills;
- the development of 12 000 acres of land mainly for cattle production in S. Karabungan;
- the development of about 2 000 acres of agricultural land for smallholders and private investors close to Beluru;
- improvements and intensification of agriculture on already occupied land.

NIAH-SUAI

- the development of about 40 000 acres of agricultural land for estates and smallholders;
- the establishment of a large oil palm mill;
- the establishment of a Timber Complex;
- large scale logging operation to feed the Timber Complex and possibly production for export.

LONG LAMA

- the completion of the Beluru-Long Lama road, which it is envisaged will give Long Lama a status as a Sub Regional Centre for a large part of the Baram District;
- improvements and intensification of existing agriculture along the new road;
- a possible start to the establishment of a Timber Complex in Long Lama based on the FAO Unit 7.

LABANG - TUBAU

- the completion of a new trunk road from the Miri-Bintulu road to Labang and Tubau;
- improvement and intensification of agriculture on already occupied land along this road;
- the development of about 14 000 acres for agriculture by private investors between Tubau and Labang and the start of a new Service Centre in this Area;
- large scale logging operations to feed a new Timber Complex located where the new road from Labang meets the Miri-Bintulu road;
- the establishment of Sub District Offices in Labang and Tubau.

SEBAUH

- the establishment of a Lower Secondary School.

The growth of Bekenu and Marudi is envisaged as being based on improvements and extensions of the agricultural land around the two centres. Moreover, the growth of Marudi will depend on whether a road via Bakong could be extended to Marudi. If this does not prove feasible, the proposed Bakong road should be reconsidered.

4. REQUIREMENTS OF PUBLIC SERVICES AND URBAN ROADS

The requirements for public services and roads are based on the target populations for the settlements listed in Table 1 and on an estimate of the population in their catchment areas. The distribution of public services as shown in Table 2 has been derived through two stages. First, the standards described in the Planning Manual for Services and Infrastructure was applied somewhat mechanically to the population figures.

REQUIRED PUBLIC SERVICES AND ROADS IN EXISTING AND NEW SETTLEMENTS 1975 - 1980

cility	Batu Niah	Niah	Beluru	Bekenu	Sebauh	Labang	Tubau	Long Lama	Marudi	Kuala Baram	Bukit Peninjau	Tun Openg Bazaar	SOP Village	Sungai Tangit	Ladang Tiga	Subis I	Subis II	S.R.C in Niah-Suai	Vill-ages (3)in Niah-Suai	Ser-vice Centre Tubau-Labang
Streams	1							1	1		1		1	1	1	1	1	2	1	1
econdary Unit					1			1	1			1						1		
ty Health e			1												1			1		
fice Class C	1		1												1			1		
Agent						1	1				1		1	1		1	1		1	1
olice Station	1																	1		
Post			1												1					
Post						1														
trict Fire de	1											1			1			1		
trict Office			1			1	1											1		
us Buildings	1			1		1					1		1	1	1	1	1	2	1	1
ty Hall			1	1										1	1	1	1	1	1	1
nd Play-ds (acres)	2		2	2		2	2	5	5		1			2	2	2	2	10	2	2
miles)					-				-											
ondary Roads	1.0		1.5	1.7				2.6	1.1					1.6	1.6	1.6	1.6	4.3	1.6	1.5
ess Roads	4.2		2.0	1.6		3.2		2.9	4.0			3.4		3.4	4.0	3.4	3.4	4.0	3.4	3.2
tre Roads	.5		1.7	1.6		.6		1.5				1.6		1.6	2.0	1.6	1.6	2.0	1.6	.6

This resulted in a distribution of public services, which has then been discussed with the various departments responsible for their provision. These discussions led in general to a reduction both in standard and in the number of units. The implication of this seems to be that the population thresholds presented in the Planning Manual are 'ideal' or target thresholds, which at the moment are beyond the manpower and financial capacity of Government.

5. COSTS OF PUBLIC SERVICES AND URBAN ROADS

A preliminary estimate of the costs of public services and urban roads outside Miri and Bintulu has been based on the unit costs in the Planning Manual. The cost figures exclude the aquisition of land. The cost figures for Miri and Bintulu have been estimated roughly. All cost figures will be refined later.

The costs corresponding to the physical requirements listed in Table 2 are shown in Table 3. As shown in the table the most expensive sector will be Education requiring nearly $8 mn.

TABLE 3 COSTS OF PUBLIC SERVICES AND URBAN ROADS IN EXISTING AND NEW SETTLEMENTS 1975--1980

Type of Service	Costs in 000 Dollars
Education	7 950
Health	225
Postal Services	330
Police	910
Fire Protection	300
Sub District Offices	1 700
Religious Buildings	650
Community Halls	550
Parks and Playgrounds	95
Urban Roads	4 380
Total	17 090

The rapid population growth and increased importance of the Regional Centres - Miri and Bintulu - will require a large number of new public service facilities and urban roads. A preliminary estimate of the type of services required and the corresponding cost figures is shown in Table 4. The figures for Miri include a General Hospital at a provisional cost of $20 mn and a new government offices complex at $5 mn. In the cost figures for Bintulu a provisional sum of $5 mn has been indicated for the first stage of a univerisity.

New urban roads in Miri have been assessed at an annual cost of $500 000. Urban roads in Bintulu are based on the specific projects outlined in the provisional Structure Plan for the town.

TABLE 4 COSTS OF PUBLIC SERVICES AND URBAN ROADS IN MIRI AND BINTULU 1975-1980. In 000 Dollars

Type of Infrastructure	Miri	Bintulu
Government Offices	5 000	800
General Hospital	20 000	
Post Office	450	
Primary Schools	1 200	1 200
Lower Secondary School	1 075	1 075
Pre-University Level		1 500
Univerisity		5 000
Kindergartens	150	150
Mosque	1 000	
Miscellaneous	200	100
Urban Roads	3 000	12 800
Total	32 075	22 625

6. COSTS OF SPECIFIC TRANSPORT PROJECTS

Table 5 shows the various tranport projects envisaged through the period 1975 to 1980. Some of the projects will be started earlier than 1975 or finished later than 1980. The figures presented, however, relate only to the estimated costs to be incurred during the period 1975-1980. The cost figures for port development in Bintulu and Miri are not shown in the table. These figures are estimated to be in the range of $50-100mn in Bintulu and $3-5 mn in Miri. Reliable cost figures for these two projects will be available when the proposed port feasibility study has been completed.

TABLE 5 COSTS OF SPECIFIC TRANSPORT PROJECTS 1975-1980

Transport Project	Costs 000 Dollars
Roads:	
M-B road to Labang	2 300
Labang - Tubau	4 000
M-B road	7 500
Pavement of the M-B road	33 600
K. Baram - Brunei border	3 000
Beluru - Long Teru	1 000
Long Teru - Long Lama	3 000
Land Development Schemes in Lambir-Subis	650
Connection of the Settlements in the Niah-Suai Area to the M-B road	3 600
Bridges:	
9 bridges on the M-B road	1 200
Lutong - K.Baram bridges	200
Ports - Airports:	
Extension of K.Baram Wharf	50
Miri Airport	4 000
Bakong Road Study	50
Total	64 150

SJ/VS 7.12.1973.

A PRELIMINARY REPORT
ON THE
MANUFACTURING OF GLASS-CONTAINERS
IN BINTULU

MIRI-BINTULU REGIONAL PLANNING STUDY

MIRI-BINTULU REGIONAL PLANNING STUDY

MB/3/ECON/IND.

M. IUUL

15th September, 1973.

CONTENTS:

MB/3/ECON/IND.

GLASS-MANUFACTURING

A pre-investment study for the use of the Bintulu silica sand for a Sarawak based industry.

1. INTRODUCTION

1.1 General

The objective of this pre-investment study is to identify the possibility for establishing a glass manufacturing industry in Sarawak, based on local raw-materials.

It is the intention to analyse the conditions for glass manufacturing based on a bulk production of container glass - mainly bottles. This bottle production should create the necessary requirements for obtaining a production which meets the demand for economies of scale in a medium sized glass producing industrial unit.

Considering a basic production of bottles and other containers, supplementary production could be added, including fancy glass wares and certain products for the construction industry (e.g. glass tiles and mosaics). The enterprise should be operated along ordinary commercial lines and should consequently meet the demands for commercial feasibility. However, it might be considered that a certain pioneer industry status during the first years of operation would be a desirable and probably necessary arrangement. This might include an intermediary protection from competing industries outside the State.

Thus, the present study roughly covers the question of location, product line, techniques and the economic implications.

1.2 Present state of the industry

There is at present no glass industry in Sarawak, Sabah or Brunei, Although the silica-sand, which is a fundamental raw-material in the glass production is available in both the First and Fourth Division of Sarawak and at certain locations in Brunei and Sabah, no effort has been made to utilise this resource up to now in either of the mentioned States.

However, container glass manufacturing is a well established industry in Peninsular Malaysia. At present four such establishments are producing or will be producing before the end of 1973/74.

The total capacity of these units at that time will be approximately 290 ton/daily of glass wares, which at this time will probably be considerably more than the demand within Peninsular Malaysia.

The factories include Kuala Lumpur Glass Manufacture Sendirian Berhad, which is a subsidiary of the Australian ACI - group. The South East Asia management of this group is situated in Singapore (Singapore Glass Manufactures) and it might be assumed that the production of the Kuala Lumpur factory is closely linked to the Singapore factory. This will have a certain impact when export market possibilities are considered.

The Kuala Lumpur factory is partly based on the machinery of a former Australian factory and the 90 ton/daily capacity of this factory was met by a reduction of the Singapore factory's production (one furnace was pulled down). The 1971 production was approximately 59.5 mn units of bottles and miscellaneous containers which is probably around 70 percent of the full capacity. The total plant investment was estimated at $6.2 mn by the end of 1969.

Malayan Glass Factory Berhad is a Johore Bahru based company representing strong interest from the beer and soft-drink producers (the Fraser and Neave group), which thus extend their financial control into the producers of bottles for the beverage industry.

The Johore factory has a capacity of 90 ton/daily which should amount to approximately 80 mn bottles and other containers at full capacity production. The 1971 production was 10 mn units or less than 15 percent of full capacity. The book value of the plant in 1971 was assessed at $4.9 mn.

It should be noticed that the number of units produced do not necessarily correspond to the ton/daily capacity of the factory furnaces. Different product-mix will influence the unit/ton figure.

JG Glass - Containers (Malaysia) Sendirian Berhad. This Selangor based company is financially related to a major Indian glass producer. The capacity of the factory is planned to be 60 ton/daily and the production should be mainly concentrated on bottles, jars and other container glass wares.

As the factory is not yet in operation the utilisation of capacity is still unknown but a 65 percent production is envisaged for the first years of operation. The establishment cost in 1968 was estimated at $1.8 mn but substantial increases in this figure are expected when final construction costs are assessed. The total amount of containers (i.e. bottles and others) produced would at full capacity amount to at least 50 mn units per year.

Endura Glass-ware Sendirian Berhad is another Malaysian (Peninsular) glass factory which should start production in the near future. This factory is planned at a capacity of 40 ton/daily mainly of bottles and other containers. The capacity utilisation in the first years of operation is estimated at about 80 percent corresponding to approximately 30 mn units (full capacity: approximately 40 mn units). The factory should be established at a total cost of $2.5 mn and it is financed with a substantial contribution of Singapore capital.

Another recently established glass-factory in Selangor is producing glass containers but as limitations have been made in the granting of its pioneer status this factory does not produce bottles. However, The Eastern Glass and Lighting Sendirian Berhad has applied for an extension of its present 10 ton/daily tank furnace and a pot furnace with a bottle manufacturing line. The present establishment is an all Malaysian company with a total investment are $1.15 mn.

The total capacity of the existing container glass factories in Peninsular Malaysia will within the next few years amount to 250-300 mn units per year which must be considered as more than enough for a population of 9.5 mn with sufficient means of transport to facilitate a considerable collection and reutilisation of used glass containers.

1.3 Summary

A capacity consideration will thus hardly justify the erection of a glass manufacturing plant in Sabah or Sarawak. Only competitive production costs and better location (reduced freight expenses) would make a container glass plant in Sarawak possible. This again would have to be based on local markets in Sabah, Sarawak and Brunei as production for a Peninsular Malaysian market for obvious reasons would hardly be feasible.

2. MARKET ANALYSIS

2.1 General

The estimates of the consumptions trends for bottles and other containers depend strongly on the drinking habits and the location of the beer and soft drink manufacturing establishments. Beer and soft drinks should consequently be manufactured or bottled locally if a market for this container type is to be considered.

It is the intention to link the establishment of a glass factory with a future bottling plant whereby a market for the glass containers is secured. The economic consequences and the feasibility of a beer bottling plant in East Malaysia will not be dealt with in detail here; the present investigation of market possibilities for Sarawak glass products will thus assume that local soft drink and beer production is taking place and that a reasonable percentage of the local consumption of drinks is bottled here. By assuming the Sarawak based manufacturing of drinks, the projections for the glass bottle market can be derived from the future consumption of soft drinks and beer in Sarawak, Sabah and Brunei.

Analyses of the price elasticity for both soft drinks and beer indicate, in accordance with experiences from other countries, that a short term elasticity is recognisable but that immediate reactions on price changes tend to be smoothened out within a short time. As the direct price elasticity reflects the change in the consumption of a product caused by a change in the price of the same product, cross price elasticity reflects the impact on the demand for a product when changes are made in a competing product's price.

Although a certain cross-price-elasticity is perceptible in the soft drinks and beer market, detailed studies in this field can hardly be carried out in this context. However, it seems to be relevant to consider this aspect as the introduction onto the market of locally manufactured (or bottled) brands with consequent price reductions probably will change the distribution of sales between the brands marketed in this area.

The income-elasticity for soft drinks and beer is certainly positive, which again means that any rise in the income level will cause increased consumption of soft drinks and beers.

Assumed income/consumption ratios which are based on household budgets in Sarawak urban communities show the following relation between income and beverage consumption:

Monthly expenditure on beverages in $:	Monthly Income:- $200	$400	$800	$1500
Beer	0.35	1.75	3.75	10.50
Stout	0.25	0.75	1.10	2.00
Soft drinks	0.40	0.80	2.50	5.10

2.2 Soft drinks

The statistical information on the consumption of soft drinks is unfortunately not very detailed nor quite reliable. The supply of soft drinks to Sarawak, Sabah and Brunei is covered by import and local manufacturing.

The imports into Sarawak and Sabah are of diminishing importance as the brand products of export quality (e.g. F & N) which were formerly imported are now manufactured in local plants in Kuching and Kota Kinabalu. The traditional local production of aerated water is continued in smaller manufacturing units. The production in these factories is probably quite stable as the increased demand for ready bottled drinks is apparently absorbed by the large producers. The present consumption of soft drinks in Sarawak, Sabah and Brunei is estimated at:-

	No. Bottles in thousands per year
Sarawak	35 000
Brunei	1 000
Sabah	14 000

The consumption mentioned is covered by the large manufacturers by up to 60 percent, while local smaller aerated factories supply the remaining 40 percent.

The market is sharply divided between the two groups of manufacturers and an increasing number of brand conscious consumers tend to demand the advertised and well marketed products from the large manufacturers.

As far as the relevance to the glass industry is concerned only the large brand drinks manufacturers will be considered. This is due to the fact that the smaller factories are expected to get a decreasing market share and that they usually cover their bottle consumption through collection of disposed bottles. At present the smaller manufacturers collect used bottles from coffee shops at a price of 3 to 4 cents per unit, a price which does not reflect any cost structure but only the present production pattern according to which multiuse bottles are used as disposable containers. As at least one of the larger beer brands will continue this trade in the years to come it will hardly be realistic to count on any demand for new bottles from smaller producers of soft drinks.

The present consumption of brand soft drinks is mainly concentrated on the F & N products which dominate the market with a 50-60 percent share of total consumption. The sales of the F & N companies are at present:-

	in thousand bottles per year
Sarawak	20 200
Sabah (approx.)	8 000
Brunei	400 (+ 950 in tins)
Total	28 600

The consumption of bottled soft drinks and beer varies considerably from year to year. The explanation for this uneven development in consumption is due to different factors of which climate, crop prices, and changes in tariff and taxation regulations are the more important ones.

Consequently the present production figures are calculated on an average basis. In the consumption forecasts the average figures are projected with a growth rate which is related to past consumption trends and expected development in income. Thus the F & N consumption figures are:-

in thousand bottles per year	1970	1975	1980
Sarawak	20 200	28 000	40 000
Sabah (approx.)	8 000	11 000	15 000
Brunei	400	500	600
Total	28 600	39 500	55 600

As mentioned above other soft drink manufacturers' production will probably be only of marginal importance to the market for new bottles.

2.3 Beer

The consumption of beer in the West-Borneo states is the subject of a sufficiently reliable registration as no beer is manufactured in this area. All beer is imported and as such it is registered in the foreign trade statistics.

As in the case for soft drinks, beer is subject to varying demand. The reasons for the unsteady consumption are the same as the ones mentioned above.

The total import of lager beer was:

in thousand gallons	1968	1969	1970	1971	1972
Sarawak	296.3	399.2	473.9	433.4	609.8
Sabah	361.8	457.7	-	424.1	528.2
Brunei	225.6	270.6	262.8	290.2	319.7
Total	883.7	1 127.5	-	1 457.7	1 747.8

The consumption of stout was smaller, but still surprisingly large compared to the known lager/stout production ratio in European countries. The total import of stout was in thousand gallons:-

	1968	1969	1970	1971	1972
Sarawak	192.2	203.6	256.4	249.4	206.6
Sabah	256.7	289.3	-	328.2	343.2
Brunei	42.6	49.4	59.3	55.5	63.9
Total	492.1	542.3	-	633.2	613.7

Contrary to experiences from European consumers there is no indication of a decline or stagnation in stout consumption. The lager beer consumption might be increasing at a higher rate but this development is only just recognisable and it does not indicate any specific change in the consumption pattern. The expected development in the consumption of beer is indicated in Table 2.1 based on past trends and projections of future income.

TABLE 2.1 PROJECTED BEER CONSUMPTION 1970-1980

in thousand gallons		1970	1975	1980
Sarawak	Lager	440	575	750
	Stout	240	280	340
Sabah	Lager	440	555	700
	Stout	305	380	470
Brunei	Lager	275	330	400
	Stout	55	65	75
Total	Lager	1 155	1 460	1 850
	Stout	600	725	885
	Both	1 755	2 185	2 735

As the distribution of the sales of different brands is relevant to the establishment of a possible beer bottling plant in Sarawak a rough indication of present brand sales is given below:-

Total lager beer sales: 1.155 mn gallons

	percent	Thousand gallon
Anchor	46	532 000
Tiger	12	138 000
(total Malayan Breweries Limited MBL)	(58)	(670 000)
Carlsberg	33	381 000
Gold Harp	9	104 000
	100	1 155 000

Total Stout sales of 600 thousand gallons - are almost exclusively by Guinness, the market share of which amounts to more than 99 percent of stout sales.

A possible bottling plant in Sarawak, close to a glass container factory would probably involve one of the following breweries:

- Malayan Breweries Limited, Guinness or Carlsberg. However, it could be relevant to consider a joint venture between two of the mentioned groups, so as to obtain a more economic size and a better utilisation of capacity. In that case a combination between Guinness and Carlsberg would be a possibility.

Carlsberg expects a growing share of the East Malaysian market and also Guinness might very well want to cut the production cost of its products in order to establish increased competition with MBL, which at present dominates the Malaysian beer market.

Considering the probability that local production might increase the market share, two combinations are illustrated below:

In thousand gallons	Sarawak plant:	Peninsula plant:
Situation I	Carlsberg/Guinness Stout	MBL & others
1975	1 305	740
1980	1 735	860
Situation II	MBL	Carlsberg/Guinness & others
1975	875	1 310
1980	1 200	1 535

It should be noticed that the Carlsberg/Guinness combination in a possible Sarawak plant would include the bottling of Guinness Stout and Carlsberg lager - the production of Guinness lager types are assummed to be still produced in Peninsula Malaysia. For different reasons the Situation I example is considered to be the most relevant. The technique required to containerise and bottle outside brewery is familiar to both Carlsberg and Guinness. At the same time the capacity of these breweries might indicate their readyness to accept an involvement that could secure a larger share of the growing East Malaysian market.

At present the Malayan Breweries Limited concern does not seem inclined to enter into production which is unfamiliar to the present technical management.

2.4 Other containers

2.4.1 Large containers for food conservation and pickled produce are subject to a very high re-collection rate. Re-use of these containers is common

and the annual import consequently does not exceed 50 000 units. The market for these containers will thus be limited.

2.4.2 Glass-ware for household purposes includes low cost pressed table ware. Mainland China and France have traditionally controlled this market, with almost identical products. Production of specially pressed tumblers in already accepted designs would thus create a good possibility for competitive import substitution.

2.4.3 Glass-ware for other purposes would in a mass production context be limited to cups for latex tapping. As the basis for the proposed glass production should be pressed glass ware and as the size of the plant necessitates a limited number of products it has been attempted to identify the ones which are in a sufficiently large demand and at the same time suitable for production in a local medium size plant.

The demand for glass cups for rubber (latex) collection is assummed to increase in the years to come. Rubber production in Sarawak and Sabah is expected to concentrate more and more on the high yielding units. Consequently collection of latex will in the future be still more standardized, and more effective ways of collection will be investigated. The present known techniques include cup-tapping (daily) and poly-bag collecting (weekly). Although the poly-bag process is still not in use in Sarawak it could be envisaged that a future large share of the latex collection would be carried out that way.

Based on the assumptions that 50-60 percent of latex production will be collected in glass-cups (depending on low/high yield ratio), that future replacement requirements will be according to present experience, that tapping frequences will not fall below the 1972 level, and that the Sarawak Sabah areas in the future will amount to:

In thousand acres	1975	1980
High yield	375	425
Low yield	325	275

The total glass cup requirements will amount to:

In thousand cups	1975	1980
Annual glass Cup consumption	3 550	3 700

2.5 Miscellaneous glass products

2.5.1 Fancy glass

Besides the container production, a series of other products could be linked to an established glass furnace. The construction of a pot furnace for fancy glass products involves only a limited investment. The production of hand blown glass wares would usually increase the labour demand considerably, although an elaborate manpower training programme with the introduction of outside know-how would be a pre-requisite. The production of fancy glass wares would, however, require other markets than the local ones and the manufacturing and marketing would thus be along lines other than container production.

In spite of the difficulties in entering the export markets the diversification mentioned might be encouraged. It would be advisable to establish the container production only at first and then at a later stage include a more diversified production. Possible market potentials would then be easier to evaluate.

2.5.2 Glass tiles, mosaics etc.

The present demand for glass products for construction purposes in Sarawak and Sabah is only small. The annual import of these goods will probably be around 800 tons for all products for construction purposes (excluding rolled glass for windows). As the domestic market is thus quite limited, the products mentioned will hardly be able to sustain a specific product line. This goes for rolled/drawn glass as well. The annual import of window glass in Sarawak and Sabah is approximately 2 000 tons which is well below the 5 000 tons that should be considered as the minimum target for a product line of this kind.

Although it at present might not seem relevant to consider these products, there might very well be a need for extention of the furnace capacity to include these products at a later stage.

A feasible existing container production and an improved transportation sector might then make glass export considerations of new product types desirable.

2.6 Comprehensive demand outlook

Glass products which could possibly be produced in a plant close to the silica sand deposits in Bintulu would thus be based on mass consumers products. The demand would depend on cost structure, transport facilities and marketing. But in case the conditions mentioned were acceptable to consumers of the relevant glass wares the natural market should include Sarawak, Sabah and Brunei.

The import of empty glass bottles to these areas adds up to

in thousand bottles	1968	1969	1970	1971	1972
Sarawak	4 300	5 350	4 850	5 550	5 400
Sabah	850	2 000	-	1 900	2 300
Brunei	200	200	(750)	200	300
Total	5 350	7 550	-	7 650	8 000

Considering that a substantial part of the bottle import is consumed by soft drink products, the registered import figures will be correlated to the soft-drink consumption figures thus creating the forecast basis for the estimated future demand for soft drink bottles.

The demand for soft drink bottles and the like is estimated at

1975: 11 025 000 bottles/year
1980: 16 200 000 bottles/year

Considering a local beer bottling plant according to the Situation I (Carlsberg/Guinness combination) mentioned above, the total demand for this beer in Sarawak, Sabah and Brunei would be

in thousand bottles	Sarawak produced		
	Lager	Stout	Total
1975	4 785	8 145	12 930
1980	7 015	9 945	16 960

The projected beer consumption is calculated on a specific ratio between pint and quart bottles which at present is approximately 1:5 for beer and 2.5:1 for stout. The future ratios have been estimated at 1:3 for beer while the stout is expected to keep the same ratio.

The demand for soft drink bottles is estimated on the basis of a recovery level percentage of 80 percent - the present level is 70 percent. This means that for every 100 full bottles sold, 80 empty bottles will be returned to the factory. The net demand for bottles is thus created through replacement of non returned bottles and net increases in sales.

The present arrangement in Sarawak where empty beer bottles are scrapped will probably be discontinued if a local plant gets established. Either a lighter bottle for one-time use will be introduced or a recollection of used bottles will be established. In case that recollection is carried out the recovery rate of used beer bottles will probably be close to the soft-drink bottle recovery rate.

As experience from other countries shows a slightly lower recovery for beer than for soft drink bottles, a 70-75 percent average rate could be expected in Sarawak, Sabah and Brunei.

Thus the annual local demand for beer bottles would be

in thousand bottles	Total
1975	3 275
1980	4 250

The use of lighter disposable bottles would involve a bottle demand equivalent to the beer consumption, compare the consumption figures above.

An economic evaluation of bottle cleaning and freight costs will indicate the more feasible solution on this container problem.

The average weight of the present soft drink bottles varies between 425 and 460 gm. If the future average soft drink bottle is 425 gm. (Coca-Cola, approximately 300 cc) and 450 gm. (F&N, approximately 300 cc) the future demand for these would amount to 4 850 tons/year in 1975 and 7 125 tons/year in 1980.

The demand for beer bottle glass would again depend on the size of bottles used. If it is assumed that the average re-use and bottle weighs 265 gm. and 450 gm. for pint and quart size respectively the demand for beer bottle glass would be 1 150 t/year in 1975 and 1 500 t/year in 1980.

If a one-time bottle was introduced for both lager and stout the figures for 1975 and 1980 would amount to about 3 170 t/year and 4 200 t/year respectively.

The larger food containers of which approximately 50 000 units were imported to the area, would, if an average size of 1 200 gm. is used as a computation unit, amount to 75 tons for a year in 1975 and 95 tons in 1980.

Household ware would probably amount to 1.3 mn units per year corresponding to 225 tons of glass in 1975 and 285 tons in 1980.

Glass ware for other purposes involves mainly latex tapping cups with an average weight of 225 gm. On an annual basis this amounts to a demand for 800 tons in 1975 and 835 tons in 1980.

2.7 Competitive demand outlook

The calculations concerning the potential demand for relevant glass products in Sarawak, Sabah and Brunei have not included the possibility of competitive supply from existing glass producers in Peninsular Malaysia, Singapore and other traditional suppliers to their market.

However, as it is a condition for the establishment of a Bintulu glass plant that it will be feasible in a free competition situation, preferences that are not price/quality directed are assumed to be non-existant. It is consequently not assumed that corporative connections might twist demand into channels that are not competitive on a real price/quality basis.

Based on these assumptions the submarkets mentioned for Sarawak manufactured glass products are expected to be:

Soft drink bottles - market share 75 percent. A continued outside supply of some specific bottle types is assumed. At the same time it is considered that a complete stoppage of supplies from Peninsular Malaysia bottle manufacturers is difficult to establish - especially with Sabah soft drink plants. The volume of bottles is calculated partly based on the existing 400 cc soft drink bottles. A complete abolition of this type will probably increase the volume of bottles produced as sales will probably increase by the change to 300 cc bottles and less.

Beer bottles - market share 100 percent. The establishment of a beer bottling plant close to the bottle manufacturer excludes other suppliers under ordinary open market conditions.

Large food containers and household ware - market share: 50 percent. Traditional trade channels will probably keep a part of thismarket which generally must be considered as less transparent and consequently less sensitive to price-changes. Furthermore,it is only expected that the Sarawak glass plant will take up certain mass products and that the demand for glass not produced locally must be met by imported supplies.

Rubber-tapping-cups - market share: 90 percent. Only a marginal supply of this product is expected from outside suppliers. Certain trade channels and future plantation arrangement might justify a 10 percent import.

The annual demand for locally produced glass product will thus be:

Product	Market share percent	Annual production in tons 1975	1980
Bottles:			
soft drinks	75	3 640	5 345
beer (local)	100	1 140	1 500
Large food containers:	50	30	50
Household ware:	50	110	145
Other glass i.e. rubber cups:	90	720	760
Total yearly production	-	5 640	7 800
Total daily production	-	16.1	22.3

2.8 Present price structure

A complete picture of the market price for glass containers is difficult to obtain as quantity rebates, cost calculations and other factors seem to disguise the actual cost/price structure.

However, a certain indication of the bottle cost ex-factory can be given based on different consumers' information.

The sales costs from the major Malaysian glass producers has been calculated at:

in $ per bottle	pint	quart
type 1 (Carlsberg/Gold Harp)	0.14	0.22
type 2 (MBL)	0.13	0.19
type 3 (F & N 300 cc)	0.20	

The freight cost which should be added when the Sarawak/Sabah c.i.f. costs are considered are as follows:

	in $/ton		
from Port Klang to	Shipping	additional charges	total
Kuching	37.00	6.00	43.00
Miri	35.00	10.00	45.00
Brunei	36.50	4.00	40.50
Kota Kinabalu	36.25	4.00	40.25
Sandakan	38.50	4.00	42.50
Tawau	44.00	4.00	48.00

When shipped locally the cost would probably amount to:-

	in $/ton		
from Bintulu to	Shipping	additional charges	total
Kuching	13.00	12.00	25.00
Miri	11.00	12.00	23.00
Brunei	13.00	12.00	25.00
Kota Kinabalu	17.00	12.00	26.00
Sandakan	19.00	12.00	31.00
Tawau	23.00	12.00	35.00

As can be seen the average difference in $/ton is around $12-18 corresponding to 2 to 3 cents per empty bottle, according to size. For full bottles this amount should probably be increased by 25-30 percent.

If the establishment of a beer bottling plant in connection with the glass plant in Bintulu is realised (according to the Situation I example, envisaged above) the following savings could be envisaged in 1975 and 1980.

		Present structure costs	Situation I Costs
		$	$
Empty soft drink bottles: Port Klang - Sarawak/Sabah	1975:	610 000	-
	1980	890 000	-
Empty soft drink bottles Bintulu - Sarawak/Sabah	1975	-	340 000
	1980	-	500 000
Full beer bottles: Port Klang - Sarawak/Sabah	1975	735 000	-
	1980	965 000	-
Full beer bottles: Bintulu - Sarawak/Sabah	1975	-	455 000
	1980	-	595 000
Beer bottles costs	1975:	2 325 000	-
	1980:	3 055 000	-
Beer collection, shipping, cleaning costs (75 percent recoverable + 25 percent new bottles)	1975:	-	730 000
	1980:	-	960 000
Total freight + bottle costs etc.	1975:	3 670 000	1 525 000
	1980:	4 910 000	2 055 000
Difference between present structure and Situation I Structure	1975:	+2 145 000	
	1980	+2 855 000	

The calculated savings originate from the beverage industry unless present price policy from the side of the glass manufacturers includes a certain absorption of transportation-costs. That, however, is hardly the case.

This means that the establishment of a local beer industry might be attractive and that freight costs are so extensive that a glass manufacturing plant should suffer from most unfortunate economies of scale if competitive production should not be possible.

3. GENERAL TECHNICAL DESCRIPTION

3.1 Raw materials

Container glass and ordinary tumbler glass etc. are made out of a mixture of certain raw materials. This mixture is called the batch.

Sand is the most important material. It must, however, possess a high content of silica (SiO_2), reasonably uniform grain size, no large grains and only a little dusty material. Besides, the contents of iron oxide (FeO) should be limited, according to the use. Maximum FeO content should not exceed 0.03 percent for colourless glass containers and other colouring materials should not be present in great enough amounts to give rise to detectable colours.

Other natural materials used to furnish glass constituents include limestone (which provides calcium oxide $CaCO_3$), dolomite (which provides calcium and magnesium oxides, CaO. MgO), feldspar, lepidolite, nephelite-syenite (alumina, silica and alkali metal oxides). Other raw materials consist mostly of carbonates, nitrates and oxides of the elements used.

In order to illustrate the composition of the raw materials used in container glass the approximate percentage of the different materials is indicated below in Table 3.1.

TABLE 3.1. RAW MATERIALS CONSTITUENTS FOR CONTAINER GLASS MANUFACTURE IN PERCENT

	Containers		Tumblers
	Standard	Amber	
Silica	73.3	70.5	70.1
Boric oxide	0.1	-	0.7
Aluminia) oxide	1.3	2.1	2.6
Iron)			
Lime	9.1	8.9	5.4
Magnesia	0.2	1.4	3.6
Soda	15.4	16.0	16.8
Potassium oxide	0.1	0.6	0.3
Miscellaneous	0.5	0.5	0.5

3.2 Batch preparation

The raw materials are stored in silos and are weighed out and mixed before being sent to the furnace. The weighing might be automatic but could also in medium and small size installations, be manual or semi-automatic. When the raw materials are weighed out, the batch is tipped into the mixer which is very similar to the traditional concrete-mixer type. The batch is, after mixing, either discharged into a hopper that holds one production unit or it is elevated and conveyed to a storage silo.

It is usual to include in the mixing a proportion of broken glass of the same composition as that to be made. This is supplied from waste glass incidental to manufacture and is called cullet. Usually this cullet is added in small sized pieces.

3.3 Melting

The traditional way of glass-melting in pot-furnaces is still used in special glass production when only small quantities of glass mass are required.

Large amounts of glass are melted in tank furnaces (Siemens technique) in which the walls restrict the glass melting area and the flames pass over the surface of the glass. Usually the glass tanks are worked continuously (smaller tanks below 10 tons capacity might be worked as day-tanks).

When the tank is continuous the batch is charged into one end, the so-called dog house. The homogeneous semi-fluid glass is then removed at the other end for feeding into the forming machines.

The tanks are divided into a melting and a working end by a wall. Communication between the two sections is usually through a submerged hole in the wall (dog hole). The heating is carried out by flames passed from side to side (or back to side) over the glass mass. Both oil and natural gas are well suited as sources of energy.

During the melting process which covers several stages, the temperature varies between 1 250°C and 1 600°C, depending on the product.

The melting and the subsequent refining includes decomposition of the carbonates, sulphates and nitrates in the batch with an evulsion of the corresponding acid gasses (CO_2, SO_3 etc.). In addition water is driven off from wet sand and crystalline salts. The more easily fusible materials form a glaze and the grains of silica disappear.

3.4 Forming

The most common method for manufacturing glass containers is blow moulding. In this process the globules of semi-fluid glass are transferred to a blowing mould in which compressed air forces them out to their final dimensions. An alternative process for manufacturing containers is by pressing.

The moulds for glass container manufacturing are mostly of fine-grained grey cast iron. For most purposes the moulds are used hot at temperatures approaching 600 degrees centigrade.

3.5 Annealing (i.e. cooling)

To make commercial glassware safe to use it must, after receiving its final shaping, be cooled very slowly. This process is known as annealing. Technically this is done by passing the ware on a conveyor belt down a tunnel leer in which a suitable temperature gradient is established.

4. RESOURCE ANALYSIS

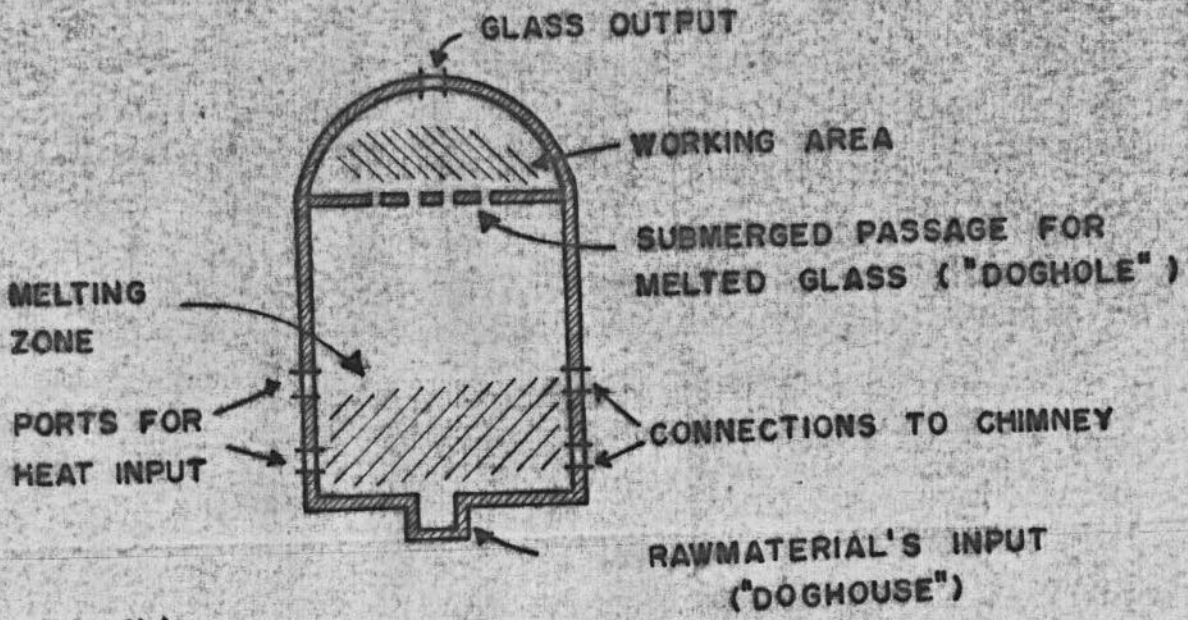
4.1 Raw materials

In the General Technical Description an indication of the raw material requirements was given.

The main quantities necessary for container glass manufacturing were for a one ton batch approximately (varying according to use and colour)

	Tons
Silica sand	0.700
Boric acid	0.005
Alumina/iron oxide	0.020
Lime	0.080
Magnesia	0.025
Soda	0.160
Potash	0.005
Miscellaneous	0.005

GLASS FURNACE



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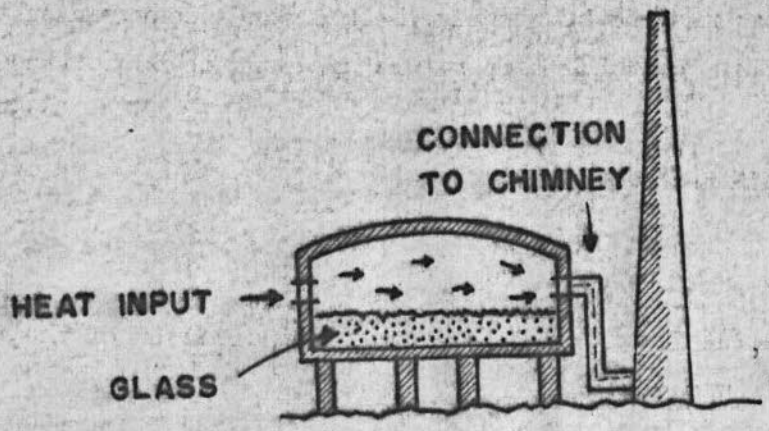


(CROSS SECTION)

NOT TO SCALE

Of the components mentioned the silica sand is available locally. As this represents 70 percent by volume of the total raw material requirements, considerable savings in transport costs are envisaged.

Another local raw material is lime which represents around 8 percent of the batch volume.

All other raw materials should be imported which naturally adds a freight cost to the actual material price.

The reason for establishing a glass factory is based mainly on three factors. The first, is the need for industrial development in the Bintulu area which favours the establishment of a major manufacturing industry.

The second is the future development in the communications systems which places Bintulu in a favourable situation when proximity to both Sarawak and Sabah markets should be considered. Third, and not least important, is the availability of glass sand with a high silica content in the area where the future industrial development is envisaged.

4.2 Glass Sand

The silica sand deposits have been prospected by several parties following a repeated revival of Japanese interest in Sarawak glass sand.

The sand in the area is considered to be of such quality that it would be suitable for manufacturing of colourless optical glass products. But as these more refined products are not considered, initially, questions as to the possible necessity of washing and/or refining of the sand are not relevant.

The glass sand occurs on terrace alluvium in the coastal area north of Bintulu.

The deposits have, in spite of the repeated prospecting efforts, never been completely investigated and the total resources are thus unknown. To assess the actual amounts of suitable glass sand it would be necessary to carry out a detailed survey based on transects with proper pitting and drilling in the whole area. Figure 4.1 shows the source of the occurences, which by different sources have been estimated to be at least two to three mn tons of high grade silica sand. This figure is

probably a very conservative estimate and assuming that even more extensive occurences are available north of the mapped area there seems to be no doubt that sand of acceptable quality will be available in the future. This will, however, only be sufficient for an industry which will probably never consume more than 20 000 tons/year. (In this century not more than 10 000 tons/year). The export of glass sand would change the picture, as the capacity of a large operation might amount to 400 000 tons/year.

Thus a detailed survey should be carried out before a major export of glass sand is initiated. It is probable that an export operation could prevent the establishment of a viable industry.

The samples from prospecting in the relevant area (Figure 4.1) show a very high silica dioxide and a low iron trioxide content of the glass sand. The numbers on the map represent the samples; the corresponding analysis results are shown in Table 4.1. At the same time the depths of the occurences are indicated for the sample location. Sieve analyses to determine the size and distribution of the sand grains have been carried out both in connection with the past prospecting work and by Japanese potential buyers (MARUSEN Co.). In both cases the samples were satisfactory for glass production. As the sand is alluvial only a limited cost will be involved in exploiting it.

TABLE 4.1. ANALYTICAL DATA FOR GLASS SAND DEPOSITS SHOWN IN FIGURE 4.1

	No	SiO_2	Fe_2O_3	Depth
A	1	99.45	0.018	5
	2	99.70	0.02	2
	3	99.47	0.018	8+
	4	99.41	0.01	8+
	5	99.05	0.01	8+
	6	99.65	0.03	8+
	7	99.35	0.02	5+
B	1	99.18	0.15	8+
	2	99.05	0.21	8+
	3	99.60	0.02	8+
	4	99.55	0.01	5+
	5	99.79	0.0085	5
C	1	99.35	0.01	8+
	2	99.19	0.02	8+
	3	99.62	0.02	8+
	4	99.40	0.10	8+
	5	99.47	0.02	8+
	6	98.84	0.03	16
	7	99.34	0.04	8+
	8	99.48	0.03	3
	9	98.84	0.03	7.5

con't.

LOCATION OF BINTULU GLASS SAND DEPOSITS

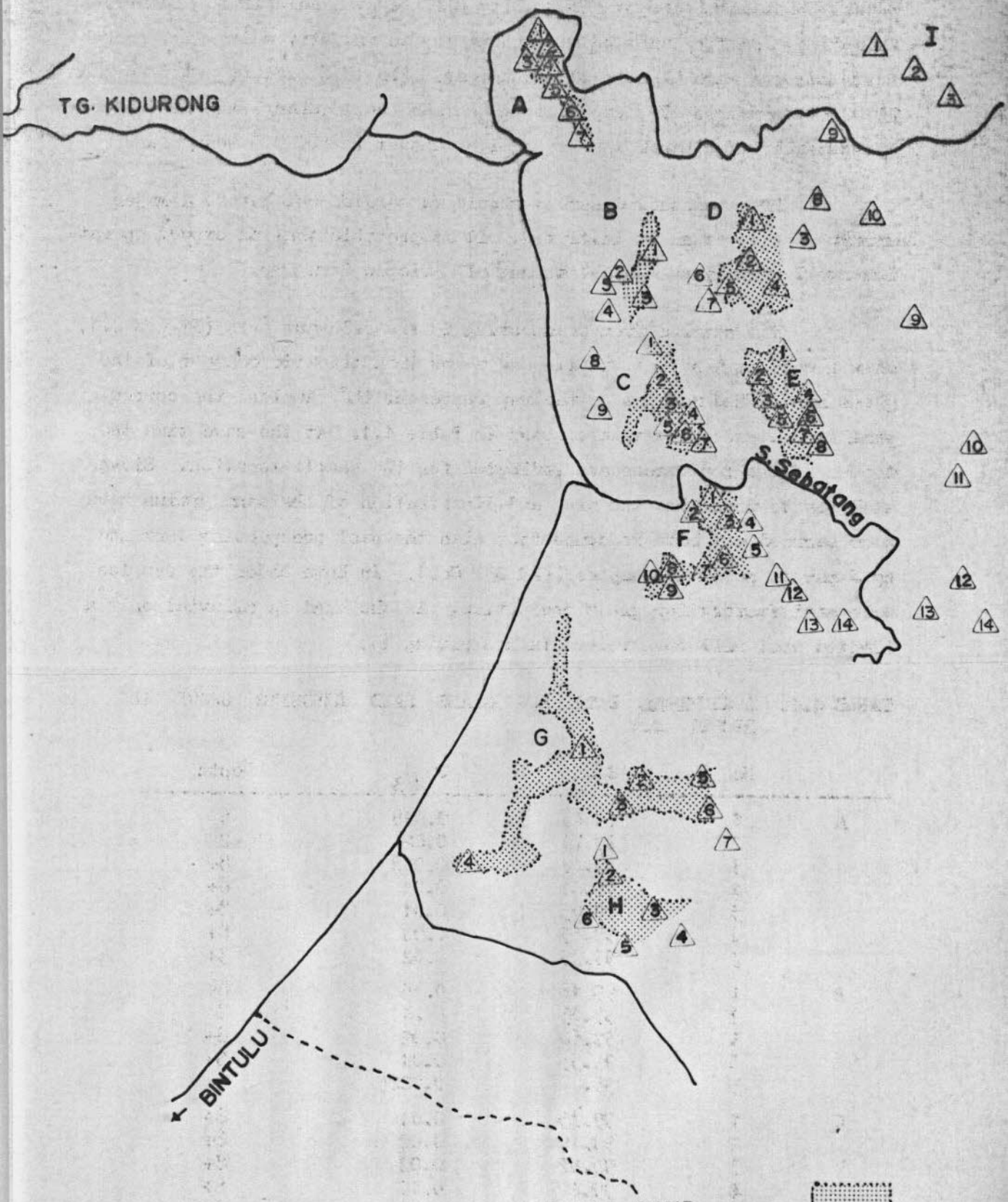


TABLE 4.1. ANALYTICAL DATA FOR GLASS SAND DEPOSITS SHOWN IN FIGURE 4.1 (con't)

	No	SiO_2	Fe_2O_3	Depth
D	1	99.45	0.01	5
	2	99.60	0.02	5+
	3	99.48	0.03	5
	4	99.17	0.01	2
	5	99.23	0.01	5+
	6	99.48	0.03	6.5
	7	99.84	0.0087	6
	8	99.48	0.03	3.5
	9	99.48	0.03	10
	10	99.61	0.013	.
E	1	99.25	0.03	5
	2	99.18	0.03	5+
	3	99.70	0.018	.
	4	99.40	0.01	2
	5	99.66	0.02	5+
	6	.	.	0.5
	7	99.73	0.022	.
	8	99.45	0.01	5
	9	99.65	0.013	.
	10	98.84	0.03	8
	11	98.84	0.03	7
	12	99.61	0.013	.
	13	98.84	0.03	5
	14	99.50	0.022	.
F	1	99.25	0.02	5+
	2	99.40	0.03	5+
	3	99.75	0.03	5+
	4	99.80	0.0159	5
	5	98.84	0.03	15
	6	99.15	0.02	5+
	7	99.05	0.01	5+
	8	99.33	0.01	5+
	9	99.08	0.06	8
	10	98.84	0.03	6
	11	99.43	0.018	.
	12	.	.	3.5
	13	99.45	0.018	.
	14	98.84	0.03	7
G	1	.	.	4
	2	99.41	0.018	.
	3	99.76	0.010	3+
	4	99.70	0.027	5+
	5	.	.	0.5
	6	99.50	0.022	.
	7	98.76	0.03	10
H	1	.	.	5
	2	99.66	0.063	3+
	3	99.15	0.018	3+
	4	99.82	0.0091	5
	5	.	.	5
	6	99.83	0.0092	4.5

The deposits occur on the surface of the present terrain and only limited information is known on the humus contamination of the surface, this should therefore be investigated in detail.

The layer of glass sand in the areas considered for industrial exploitation varies between six and nine feet plus deep. As less than one foot humus and other non-(glass) silica sand material covers the surface, earth moving equipment in the medium to light class is considered to be sufficient to obtain the glass-sand.

The sand exploitation operation will be carried out by one wheel loader which will scrape, haul and dump the glass sand into a stock area on the plant premises.

The present data on the sand resources indicate that with a proper plant location hauling distance should not exceed 250-300 yards. The production price at the plant of the glass sand would thus be $4 per ton which including an estimated ten percent royalty would amount to a total sand raw material cost of $4.50 per ton.

4.3 Lime

Considerable limestone occurences in the Niah area are of a hard and pure quality that would make it suitable for glass manufacturing. Quarries have already been in operation on the West side of the Niah river and easy access to the lime thus exists.

The quarrying cost amounts to around $8 per ton, which including loading, and road transport to Bintulu would add up to $20 per ton. If crushing and some sorting is assumed a $25 per ton price at factory is probably very much on the safe side.

4.4 Other raw materials

As no other minerals required for glass production occur in the area in economically exploitable volumes all other raw materials should be imported.

The raw materials for container production are calculated at Port Klang cost and freight Port Klang to Bintulu. This probably represents the maximum transport costs and the actual factor cost has thus been subject to a certain over evaluation.

Including freight, the raw materials at factory in Bintulu are assumed to be: boric acid $710 per ton; aluminia oxide $335 per ton, magnesia $95 per ton; soda $50 per ton; potash $85 per ton, other chemicals such as cobalt oxide, arsenic trioxide, barium sulphate, selenium etc, etc. have been calculated on a product - mix price of $320 per ton.

The cost of cullet which can be added to the raw materials batch in different ratios depends partly on the waste factor within the factory partly on the availability of disposed glass products outside the plant.

As a continued supply of disposable containers are expected, the Sarawak/Sabah cullet price will probably be kept at a reasonable level. An estimate of $30 per ton is therefore hardly unrealistic.

4.5 Power and fuel

The possible fuel for the melting process ranges from producer gas, oil and natural gas to electric power.

Oil is now the usual source of heating but where natural gas is available this fuel is preferred as costs are generally lower.

In a future Bintulu glass factory natural gas as a fuel would probably be most economical when the off-shore gas has been made available to the planned Liquified Natural Gas (LNG) plant.

As, however, it might be feasible to start the glass production independently of this power source (i.e. before the start up of the LNG-production) the fuel requirement calculations will be based on fuel oil and electricity.

The annual requirement for fuel and electric power will probably be around:

fuel oil diesel	1 500 ton per year
electricity	450 000 KWH per year

The exact fuel consumption will depend on specific factors such as design of pre-heaters, combustion chamber, production planning etc.

Besides the requirements for power from external suppliers a stand-by diesel power plant of 110 KW is included to keep essential plant sections operating in case of power failure.

The cost of fuel is calculated on the basis of $0.75/gallon and electricity costs are estimated at $0.085/KWH. A future natural gas supply is expected to reduce these factor costs.

Water requirements for cooling and cleaning purposes are estimates at 4 mn gallons a year. Price per gallon is assumed at $0.002.

4.6 Labour

The direct labour in the glass plant is estimated at just below 50 labourers of which seven should be skilled 16 semi-skilled and 25 unskilled. Although the melting operations are automatic it would be necessary to employ four to five skilled men in this section of the plant. Glass forming operation will require two to three skilled men.

The indirect labour includes manager, supervisors, office staff and others. The manager, three to four supervisor and a chemist should all be fully experienced in the glass industry to be able to train all employees. Due to the expected difficulties in finding skilled men an arrangement for running-in and management of the factory is advisable.

An initial employment of 12 men from outside Sarawak would thus be necessary. This number would possibly be reduced to six after six months. After 18 months only the manager and two supervisors should be left. Their future attachment to the glass factory would then depend on the availability of suitable trained personel.

The total manpower requirements and the annual cost would then be:

Direct labour	No.	$
Skilled	7 @ $8 000	56 000
Semi-skilled	16 - $5 000	80 000
Unskilled	25 - $3 500	87 500
Indirect labour		
Manager	1 - $35 000	35 000
Supervisors	5 - $24 000	120 000
Office	7 - $ 3 500	24 500
Other	9 - $ 2 500	22 500
Total	70	425 500

4.7 Machinery and equipment

The principal items of the glass plant consist of water storage tank, boiler, air compressors, vacuum pump, diesel generator, stock and weighing equipment, glass melting tank, bottle forming machine, shop equipment, controls and transport equipment.

Besides the building most of the principal items must be imported. Only water tanks would be locally manufactured. The furnace will be built on the site, but special bricks and steel structures for the construction must be imported.

Possible suppliers of machinery and know-how are American, British, German, French and German manufacturers of glass-wares and machinery.

5. SIZE AND LOCATION

5.1 Plant capacity and size

In the paragraph on the future markets for glass products in Sarawak, Sabah and Brunei it was estimated that the daily demand for different glass products would amount to 16 tons in 1975 and 22.3 tons in 1980.

Considering miscellaneous possibilities for markets for other products and a certain margin for waste etc., the capacity requirements in 1975 would probably be close to 20 tons/day and 28 tons/day in 1980.

This indicates the need for a 30 tons furnace and corresponding machinery. While some of this machinery could be installed according to the increased production, the furnace should be constructed to the 30 tons capacity from the beginning.

With a rational plant design the land requirements would for the factory be approximately four acres. To allow for future extension probably six acres in total should be allocated for the plant.

A possible additional area should be available for storage of glass-sand scraped during site preparation work for other industries.

5.2 Location

The location of a glass industry in the Bintulu area depends on

- the availability of glass sand;
- the future town plan.

As it appears that a mining lease was already issued in 1969 to the Glass Sand Company covering the A, D, E and parts of the B fields (see Figure 4.1) it is probable that both legal and maybe economic difficulties will arise in having the plant on these areas. If other ones are available, and an intermediary calculation seems to indicate that there might be sufficient resources of suitable silica sand in the C and F - fields for a future manufacturing industry, a factory might be more easily established there.

Thus the F-field might contain as much as 700 000 tons while the C field and the southern part of the B field might contain around 250 000 tons. However, a detailed investigation of these areas and the one under the issued mining license must be carried out as soon as possible to confirm these estimates.

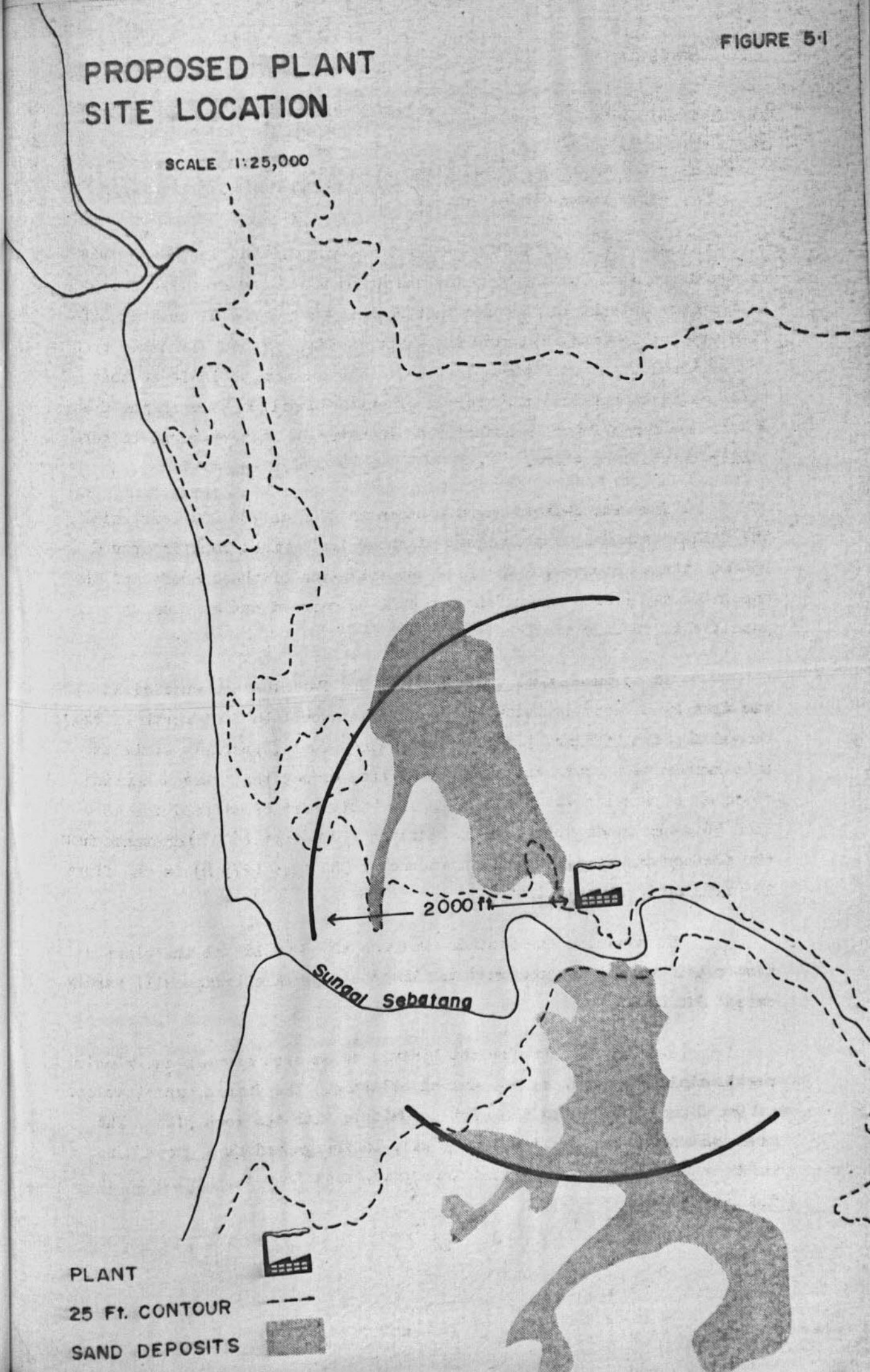
If it is assumed that the B, C and F-fields are sufficient for the factory a suitable location of the plant would be just north of the Sungei Sebatang (Figure 5.1). This location would, probably limit the site preparation costs and at the same time reduce the average hauling distance of sand to the factory. As probably sufficient sand for more than 50 years production will be within a 2 000 feet (600 m) distance from the factory an average hauling distance of 900 feet (275 m) in the first 20 years could be anticipated.

To minimize the distance between the F-field and the plant a timber bridge will be constructed. The costs of this bridge will hardly exceed $10 000.

The future plan for the Bintulu urban area assumes an extended residential area south of the Sungei Sebatang. The future exploitation of the G and H fields is thus not compatible with the town plan. The area just south of Sungei Sebatang will be designated as a green zone which separates the north river industrial area from the southern residential area.

FIGURE 5-1

PROPOSED PLANT SITE LOCATION



A certain respect for these aspects of the town plan will thus be indispensable and it will possibly be necessary to reduce the excavating work on the F-field. At the same time it will probably be expedient to scrape some of the F-areas prior to their required use in connection with site preparations in the residential areas.

This will hardly have any economic consequences for the exploitation of glass sand.

6. PRODUCTION ASPECTS

6.1 Products

The range of primary products for a Sarawak glass factory will initially be based on certain mass products for which a market has already been established. According to the above analyses of present and future markets for glass containers the range of Bintulu manufactured glass products (BG) should be concentrated on the following types:

product	BG 1	Soft drink (e.g. F&N standard)	flint
"	BG 2	" (e.g. Coca Cola)	flint
"	BG 3	" (e.g. Green Spot)	flint
"	BG 4	" (e.g. 7-Up)	emerald
"	BG 5	Beer (pint)	amber
"	BG 6	" (quart)	amber
"	BG 11	Latex cups	amber
"	BG 21	tumblers (large)	flint
"	BG 22	tumblers (small)	flint
"	BG 31 -	Household containers	flint/amber

The types BG 1-6 would be manufactured on automatic blow moulding machines. The types BG 11-22 would be pressed automatically and BG 31- would be semi-automatic or manually manufactured.

Besides the above mentioned containers a range of other products might be demanded by local consumers. Thus it would be possible to manufacture (non-automatically) specific containers for certain products or household uses.

The initial product range (1975) would include the following products volumes and unit prices:

Type	Volume thousands	Weight per piece	Weight annually	*)Price ex-factory per piece	Total Revenue in $
BG 1	3 700	0.450 kg	1 665t	0.19	703 000
- 2	2 400	0.425 -	1 020-	0.18	432 000
- 3	200	0.300 -	60-	0.14	28 000
- 4	2 000	0.450 -	900-	0.18	360 000
- 5	1 775	0.265 -	470-	0.11	195 000
- 6	1 500	0.450 -	675-	0.18	270 000
-11	3 200	0.225 -	720-	0.10	320 000
-21	300	0.150 -	45-	0.20	60 000
-22	300	0.100 -	30-	0.15	45 000
Total	15 375	-	5 585t	-	2 413 000

*) Prices are based on Singapore/Malaysia prices less 5-20 percent.

Of less mechanised production other large container and household wares will probably represent the main part. The local markets for large containers is assumed to demand around 25 000 units. As these containers (BG 31-) are usually manufactured in a range of different sizes an average size and price has been calculated. Thus the average weight is 1 200 gm and the ex-factory price $0.55. The price is calculated based on flint colour containers. Total revenue $14 000.

Household wares include besides the standard tumblers (BG 21-22) special glasses (e.g. brand glasses for advertising) cups, trays etc. As the demand for these products will depend on marketing efforts by the producer an exact product mix cannot be estimated. As was the case with the large containers an average weight and price has been calculated. Thus around 150 000 units will have an average weight of 175 gm at an ex-factory unit price of $0.50. Total revenue $75 000.

6.2 Plant and equipment

The plant is assumed to be built as an automatic glass container factory and the machinery is designed and cost calculated on the basis of a 30 ton/day capacity.

The plant is split up into the following subsections:

- Raw materials department;
- Melting;
- Forehearth and feeder;
- Forming;
- Annealing leer;
- Sorting Section;
- Machine Shop;
- Utilities;
- Laboratory.

The equipment in each department depends on the final design of the plant but an indication of the equipment and cost of each department has been made. Thus:

Raw materials department (costs $800 000)

This includes acceptance equipment with conveyor belts and loaders. The preparation of the raw materials is split up into cullet preparation (washing, sorting, breaking), limestone section, silica sand section and other raw materials section.

The weighing and mixing sections are operated automatically and includes charging of the final batch.

Melting department (costs $975 000)

The tank is constructed of different kinds of bricks (600-650t of nine brick types). The steel requirements for the tank construction are around 50 tons (5-6 profiles).

Combustion and exhaust sections are designed for oil heating and processing control is mainly automatic. Temperature, combustion, glass level, pressure and firing are assumed automatically controlled and recorded.

Forehearth and feeder department (costs $375 000)

These sections are for the mass products designed to the same degree of automation as the melting department.

Forming department (including basic moulds) (costs $800 000)

The initial production does not justify forming machine capacity that corresponds to the melting department. Consequently it is assumed to start production with three machines. The capacity of these would be a large one with an approximate capacity of 30 000 units per day and two smaller ones each with a capacity of 10 000 units per day. At a later stage an additional 30 000 unit per day machine should be installed when production volume requires it.

Besides the 3(4) bottle forming machines two press machines should be installed.

Furthermore a number of smaller semi-automatic and manual presses should provide moulding facilities for smaller product volumes. The price for these minor units range from $3 000 to $10 000.

The total forming department cost is calculated on an average scale, where the last large bottle machine is installed after four years of production (discounted to year of construction).

Annealing leer (costs $250 000)

The annealing department is assumed to be designed in two sections, one with two 1.5 m x 25.0 m annealing leers and one with a 1.75 m x 25.0 m leer.

The entire department is supposed to be constructed up to full capacity from the start of the production.

Sorting Section (costs $75 000)

Costs are mainly made up by conveyor belts, sorting light arrangements and strain finders.

Machine Shop (costs $400 000)

The requirements of the tools in the machine shop are quite high. Tools for manufacturing are to a large extent produced in the plant's own workshop, where complete mould making equipment is also necessary.

The tools include 4-6 lathes of different kinds, milling, drilling, grinding, plating machines, etc.

Utilities (costs $375 000)

The utility section comprises compressors, pumps and a generator. As the requirements for compressed air are essential throughout the forming process six compressors are considered necessary (capacity:2 x 100 kw, 4 x 50 kw). The pumps include units for water, oil and vacuum.

The generator for standby power supply is a 110 kw set, which should be able to keep up essential functions if an intermediary power stop originates from the usual supplier.

Laboratory (costs $125 000)

The extended laboratory is necessary in an area where no other analytical facilities exist. Testing and analytical apparatus will provide the necessary basis for production control and research.

Total plant cost according to the above specifications $3 650 000.-

An additional department for decoration of bottles (paint/print technique) should be added to the manufacturing plant as most soft-drink manufacturers require pre-decorated bottles.

A decoration department, however, could be considered independently and printing for covering relevant costs would simply be added to the bottle cost.

A complete printing unit in "turn-key" set up with a capacity corresponding to the soft-drink bottle production, would amount to $200 000.-

6.3 Buildings and installations

For the plant a building of 25 000 square feet (2 300 square meters) is considered necessary. Office facilities will probably take up 5 000 square feet (465 square meters). Furthermore tanks for water and fuel should be included in this calculation.

Building (manufacturing area) (brick walls, iron construction w/asbestos	$ 350 000
Building (administration area)	$ 90 000
Interior	
office equipment	$ 35 000
installations etc.	$ 35 000
air-condition, decoration etc.	$ 55 000
Tanks and piping	$ 10 000
total building	$ 575 000
total plant cost	$4 175 000
total factory cost	$4 750 000

7. ECONOMIC ASPECTS

7.1 Commercial Evaluation

The total economic analysis of the glass-plant project has been carried through on an IBM 370/145 computer with a new program derived from the COBE program which is the property of the Economic Planning Unit, The Prime Ministers' Office in Kuala Lumpur.

The programme carries out a long series of calculations based on the estimated costs and benefits of the project, cf. computer print, appendix 2.

The data for the benefit calculations are the total sales of the different containers at the prices assumed above.

The capital costs are in accordance with the description in paragraph 6.3 and the costs of operation are calculated with raw materials, power, fuel, wages, maintenances, and miscellaneous other costs, cf. paragraph 4 above and appendix 1.2.

It could however, be expected that the basis amounts and volumes assumed would not be exactly as forecast, and the economic analysis is therefore carried out in such a way that these possible variations can be anticipated.

All prices and volumes are calculated at the price (volumes) estimated above - but besides this, alternatives have been calculated for all prices (volumes) ten percent above and ten percent below the

estimates. The statistical mean value of the said price (volumes) has then been calculated and is considered here as the most probable of the solutions that can be forecast today. (Details on EDP-program and probability calculations are dealt with in the special "Manual on COBE").

Besides this specific sensitivity analyses the cash flow and the present value of the flows in the year 1974 have been calculated for the interest rates 7%, 10% and 14%. The cash flows and the internal rate of return are based on the standard figures assumed in the previous paragraphs. The cash flow year by year is printed in appendix 1.3.

THE PRESENT VALUE OF THE FLOWS IN YEAR 1974, IN 1 000 M$

BENEFITS	Rate of discount 7%	10%	14%
1. Sales of soft drink bottles	24 500	18 300	12 800
2. Sales of beer bottles	6 500	4 875	3 725
3. Sales of other containers	5 900	4 525	3 275
Total benefits	36 900	27 700	19 800
COSTS			
4. Process equipment (plant)	4 175	4 175	4 175
5. Buildings	575	575	575
6. Working capital	125	125	125
7. Raw materials (local)	525	375	275
8. Raw materials (import)	1 800	1 350	950
9. Fuel, power	3 650	2 750	1 975
10. Wages	4 325	3 350	2 475
11. Maintenance	3 175	2 450	1 775
12. Administration, misc.	1 900	1 400	1 000
Total costs	20 250	16 550	13 325

The discounted difference between benefits and cost is

Total benefits - costs	at 7%	$16.65 mn
	at 10%	$11.15 mn
	at 14%	$ 6.775 mn

The ratio between the discounted benefits and cost is

Benefit-cost ratio	at 7%	1.82
	at 10%	1.76
	at 14%	1.49

The calculations based on the cash flows (cf. appendix 3) result in an internal rate of return at 25.2 percent.

The life expectancy of the plant and its facilities is assumed to be 20 years after the beginning of production.

The terminal value of the assets are estimated in 1994 to be:

Plant	:	$ 0.-	(Scrap value)
Building	:	$ 0.-	(Scrap value)
Working capital	:	$200 000	

The land has not been included in the construction costs and no site value is thus included in the terminal value. This together with the quite pessimistic assessment of the scrap values add to the security margin of the project.

Taxes have not been included in the feasibility calculations as the status as pioneer industry and the duration of a possible tax exemption period is unknown. Any taxation of profits from this operation will, however, reduce the returns to the capital invested.

7.2 Social evaluation

A genuine social cost-benefit-analysis has not been carried through for this plant as it has been agreed on that industrial projects of this kind in Sarawak should be based on a proper commercial feasibility. Thus no weighting has been carried out as far as foreign exchange savings, premium for job creation, redistribution of income and consumption, is concerned. But it should be emphasized that social benefits if

included in the calculations would add to the feasibility of the proposed glass plant.

The foreign exchange components and the extra-regional expenditures have been worked out for the two situations: - one with a Sarawak glass production and one without any glass manufacturing.

The expenditures for the two alternatives have been discounted at 10% and thereby estimated at:

	With local glass production		Without local glass production	
Expenditures :	Foreign	Extra regional	Foreign	Extra regional
Revenue	$ 0.5	$ 7.5 mn	-	-
Cost	$ 4.5 mn	$ 7.2 mn	$ 3.0 mn	$ 20.0 mn
Net Amount	$ 4.5 mn	$ -0.3 mn	$ 3.0 mn	$ 20.0 mn

It appears that the difference in foreign expenditure components are minor. This is due to the fact that at present and in the future most glass containers for the local market will be produced in Peninsular Malaysia. The extra-regional expenditures vary considerably between the two situations. This means that in the case where no glass production is established in Sarawak, purchasing power and incomes derived from a production of more than $20 mn will be canalized out of the State.

The calculation of the above expenditures for the local plant is based on plant external cost at $4.5 mn of which $3.5 would be the foreign exchange. Discounted external costs of raw materials and spare parts amount to $3.7 mn of which approximately $1 mn would be foreign exchange.

An export of glass products to states outside the Malaysian Federation is limited to Brunei (estimated $0.5 mn). The residual $7 mn external revenue would originate from sales in Sabah.

The alternative in which all glass products should still be imported from factories outside Sarawak is mainly based on the discounted value of future demand of glass containers that could have been manufactured in the proposed plant.

Besides the commercial and currency aspects the value of establishing an industrial unit with 70 workers directly employed is evident. The possibilities for developing a diversified industrial community in the Bintulu area will depend on the promotion of new product lines in feasible industries.

8. FINANCIAL ASPECTS

The project could be constructed, operated and administered by a joint venture of Sarawak entrepreneurs and representatives of outside companies with sufficient know-how.

Considering that a foreign interest should be of relative short duration or at least of eventual minor importance only few corporate structures could be practical.

The foreign know-how, which is necessary could simply be taken in as responsible construction - management advisors in an initial period of 2-5 years, (cf. para 4.6 above). Thus no capital involvement from the know-how supplier would be anticipated. As, however, possible equipment suppliers very often would be engaged in actual glass manufacturing a joint venture might be advisable as long as a local controlling position could be maintained.

In this connection it could be expected that Peninsular Malaysian glass manufacturers would have a positive interest in a Sarawak plant as the development of a local industry would necessarily interfere with their market expectations.

In a case where the Sarawak Economic Development Corporation would be able to enter a corporation established to develop the local glass production, this solution might seem desirable as the public sector would then maintain, indirectly, a control in the exploitation of the national resources.

To illustrate a possible financing of the glass manufacturing unit an example of a corporate structure and its outside financing has been worked out.

TABLE 8.1 GLASS FACTORY FINANCING
(IN THOUSAND DOLLARS)

	1974	1975	1976	1977	1978	1979	1980
Equipment, buildings	4 750						
Working capital		125	5	5	5	5	10
Capital demand	4 750	125	5	5	5	5	10
Owners' capital	-950	-125					
Foreign 'soft loans' (machine supply) 7%	-2 500	400	700	700	700	575	
Malaysian institutional loans (e.g. MIDF) 9%	-900	100	200	200	200	200	250
Commercial Bank loans 11%	-400		100	100	100	100	225
Total payments	0	500	1 000	1 000	1 000	875	475
Net Cash flow		1 125	1 365	1 495	1 635	1 785	1 945
Difference to owners' capital		625	365	495	635	910	1 470

According to the financing schedule in Table 8.1 all outside capital will be paid back in the period 1975-80. Capital requirements are distributed as:

Owners	:	$1,075,000 of which $950,000 are paid down in 1974.
Foreign soft loans	:	$ 2.5 mn at 7% interest p.a. in 1974. redemption 1975-1979.
Institutional loans (MIDF)	:	$900,000 at 9% interest p.a. in 1974. - redemption 1975-1980.
Private banks	:	$400,000 at 11% interest p.a. in 1974. - redemption 1975-1980.

This financing follows a pattern which is not unusual for pioneer industries in Peninsular Malaysia. Only the foreign soft loans might be subject to some consideration, as a soft loan might be tied together with unfavourable equipment offers. Yet, most of relevant equipment supplying countries would have available export subsidizing loans for qualified development projects.

9. POSTSCRIPT

As mentioned in the introduction the main criterias for determining the feasibility of a local glass container production has been based on commercial economics.

This approach was requested and agreed on by the representatives of EPU and SPU although it would probably mean that certain industries which could have been justified from social economic criteria would thus be excluded.

The Bintulu glass container factory will, however, under the assumptions presented in this report be feasible on both commercial and social standards.

The market aspects as presented in section 2 are apparently quite satisfactory but a few conditions should be emphasized. The situation where a main consumer (F&N) refuses to buy local bottles, even at a cheaper price, is possible. Also negotiations with the relevant breweries must be conducted prior to establishing the proposed bottling plant in Bintulu. If, however, these market conditions are fulfilled it appears that the production of containers at a rate of 20 to 30 tons per day is quite feasible.

The proposed survey of the silica sand resource areas should be carried out and decisions as to the suitability of an isolated glass sand export should then be made.

The timing of construction and production in this report is based on a one year construction period and after that a production volume according to the expected demand up to a capacity limit which is reached after 10 years.

It has been assumed that the plant construction would take place in 1974. This might be difficult to accomplish due to the preliminary surveys and negotiations that was mentioned above.

A later construction time would naturally mean that a higher production volume could be obtained right from the beginning. The short construction period (one year) which adds to the feasibility of the factory is only possible with proper planning and a premature decision as to the construction date might well be proved uneconomic under the present conditions.

MI/VS
15.9.1973.

WHEEL LOADER FOR SILICA SAND EXTRACTION

Capacity - Calculation (CAT 920)

Assumed pay loads etc:

- capacity per haul	1.5 t
- average hauling distance	300 yards
- average haul, dump time	2x1 min.
- average scraping time	10 min.
- average glass sand/other material	3/1

Calculation:

Payload 7.5t/hour

7 hours daily = 52.5t

52.5t (3/4) i.e. Sand/other ratio = 39t/day

$$\frac{\text{Operation cost/day}}{\text{Capacity/day}} = \frac{22.3 \times 7}{39} = \$4.00/t$$

RAW MATERIALS	$/ton	Freight	c.i.f. Bintulu/ton	Batch 1 t/100	Batch 2 t/100	Batch 3 t/100	c.i.f. Bintulu for batch (in $/ton) 1.	2.	3.
Silica	4.50	-	4.50	73.3	70.5	70.1	3.30	3.17	3.15
Boric acid	675.-	35.-	710.-	0.1	-	0.7	.71	-	4.97
Alumina Ferro oxide	300.-	35.-	335.-	1.3	2.1	2.6	4.35	7.03	8.71
Lime	15.-	10.-	25.-	9.1	8.9	5.6	2.28	2.23	1.40
Magnesia	60.-	35.-	95.-	0.2	1.4	3.6	.19	1.33	3.42
Soda	15.-	35.-	50.-	15.4	16.0	16.8	7.70	8.00	8.40
Potash	50.-	35.-	85.-	0.1	0.6	0.3	.09	0.51	0.25
(cullet)	(30.-)	.	(30.-)						
Misc.	275.-	45.-	320.-	0.5	0.5	0.5	1.60	1.60	1.60
					Raw materials per ton		20.22	23.87	31.90