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18884

DP/ID/SER.A/1450
7 March 1991
ORIGINAL: ENGLISH

INSTITUTION BUILDING FOR INDUSTRIAL PROMOTION

DP/PNG/86/002

PAPUA NEW GUINEA

Technical report: Project identification and promotion of the manufacturing sector in Papua New Guinea*

Prepared for the Government of Papua New Guinea
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

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* Mention of company names and commerical products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO). This document has not been edited.

V.91 22531

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ABSTRACT

The consultancy No. DP/PNG/86/002/11-56/J 12413 (form the 28 November 1990 to the 19 January 1991) with the subject:
"Project Identification and Promotion of the Manufacturing Sector in Papua New Guinea" has been conceived as part of the UNDP project No. DP/PNG/86/002, "Institution Building for Industrial Promotion", and aimed at:

- Analyzing the existing industrial base and the natural and human resources in PNG to establish those industrial sectors worth supporting.

- Reviewing existing projects, profile list and proposals within the Department of Trade and Industries (DTI) and others.

- Establishing a broad list of activities, list products which could be introduced on an internationally competitive basis and assigning ranks of priority.

- Studying the economic environment and its conduciveness to the development process.

A list of identified projects has been established and ranks assigned to the individual activities according to their probable economic viability.
Trade Agreements, Incentive Schemes and Promotional Activities have been reviewed and analysed.
The most promising economic sectors have been indicated where manufacturing industries are likely to succeed, and an action plan for the promotion of these ventures has been submitted.

I. SUMMARY

The economic performance of Papua New Guinea in the last decade remained behind expectations. Falling raw material prices hampered the capital formation and the Bougainville crisis, starting in late 1988, deprived the country of its major single source of revenue and foreign exchange.

Despite these disturbances, the mining industry remained PNG' most dynamic economic sector.

PNG's Government is conscious of the temporary nature of benefits accruing from mining and intends to incite a more balanced growth of the economy by promoting the manufacturing sector.

Manufacturing is seen as the most promising sector with the highest growth potential in the industrialisation process.

PNG's modern or formal sector absorbs only 12% of the economic active population, the rest remaining in the so called informal sector as subsistence farmers, petty traders and artisans.

The purchasing power is mainly confined to the part of the population employed in the formal sector. Employment opportunities are concentrated in urban centres and newly created mining settlements, which are widely dispersed in the country.

The inland market of PNG is therefore extremely limited and geographically fragmented.

The Manufacturing sector retained a contribution to the GDP of 10% over the last ten years with no sign ɔ improve its share. The government has made efforts to ameliorate its performance but to no avail.

The main emphasis has been laid on the promotion of industries to process local raw materials further in order to export higher value added products and to explore the chances of import substitution.
To screen the possibilities of downstream processing- and import substitution industries, criteria have been drawn up to assess the cost and benefits for PNG in any given case.

A list of 54 projects and project ideas has been drawn up and the projects ranked according to their probability of successful realisation.

As could be expected, the resource based projects have been found to be most promising.

The majority of viable projects identified are in the agricultural sector. Among the renewable resources, this sector appears to be most promising. Additional cash crops may be introduced such as pulses, beans and eventually natural fibres like jute and cotton. The main problem remains the improvement of the agricultural extension service also for the benefit of rice and peanut growing.

Forestry is a very promising and exploitable resource. To keep this asset renewable, a new approach has to be taken in the resource management and further reforestation programmes have to be developed. The viability of downstream wood processing to the stage of exportable finished products and the development of competitive processing industries, preferably as joint ventures with foreign enterprises with marketing experience in this field, needs further studies.

The fishery sector will be of vital interest in the medium and long term, especially in view of securing and improving the nutritional base of the population.

The export potential of the tuna reserves is beyond doubt. Policy changes will be necessary to persuade foreign companies to form

joint ventures with PNG partners and create on shore fish processing facilities.

The manufacturing of clay bricks, blocks and tiles appears to be promising whenever clay deposits are available near urban centres. Import substitution industries without a raw material base face major difficulties. No project has been found which qualifies unanimously.

The discoveries of substantial oil and natural gas reserves give hope to develop a petroleum based chemical industry within PNG.

Investment cost are high and for national investors still out of reach without the co-operation of large foreign firms. The impact of the petroleum sector on PNG in the near future can only be guessed but not assessed.

The industrial policy faces major constraints due to the integration of PNG in the world trade. PNG is a price taker for all its agricultural products and cannot enforce further processed materials on the world market on its own terms.

The monetary policy is directed towards maintaining a strong value of the Kina. This has the effect that manufacturing industries without a raw material base and relying on extremely low wages, cannot compete successfully in the world market.

The Trade agreements with Australia and New Zealand (PATCRA and SPARTECA) allow PNG to regard these two countries as a quasi home market. PNG has not yet been able to reap the full benefits of these arrangements. Japan and Germany are PNG's most important export partners. PNG may therefore pay more attention to Japan and the European Economic Community in its search for overseas investors. Incentive schemes to foster industrialisation have been devised and changed on various occasions. The government is presently revising its entire incentive and investment promotion policy.

Fiscal industrial incentives have to be seen in the light of disincentives which exist through deficiencies in the public administration and the overall business climate. The government must weigh the opportunity cost of providing incentives (lost revenue) against the funds needed to improve the business climate. The business climate is determined by the public services behavior towards the business community and commerce in general and the existing material and social infrastructure.
The amelioration of the business climate may go a long way to strengthen private investment in PNG.
A new dimension will be added to PNG's official promotion with the creation of the Investment Promotion Agency (IPA). The new agency will ideally be a liaison between the business community and the public administration. Though the government cannot subordinate its priorities entirely to the private sector whenever divergences arise, IPA will be more promotion- than control-oriented.

Apart from the official promotion of investments, more use should be made of bi- and multilateral institutions with the task of promoting joint ventures in third world countries. The Centre for the Development of Industries (CDI) in Brussels and the Investment Promotion Services of UNIDO can be entrusted with the search for suitable partners and also requested to help in the overseas marketing of exportable products.

Promotional services on a bilateral basis through experts attached to private business associations, like chambers of commerce, should be requested from countries seen as prime targets for PNG's exports.

In conclusion it can be stated that the transition of PNG's agrarian society to an industrial one is still far off and cannot be foreseen for the near future. The informal sector will retain its dominance for a long time to come and all political efforts should be directed to the creation of employment opportunities through activities which are appropriate to the conditions in the countryside. The promotion of large scale investment in the resource sector should

not take up local funds needed to support the economic development in the informal sector and the building up for the country's infrastructure. The young history of PNG's mining development has shown that foreign capital influx has supported it independently of government's participation in it.

PNG should not yield to the temptation to support large scale investment in manufacturing which does not find unanimous support by the private sector, leaving alone machine suppliers, interested to sell their product. Many developing countries have fostered manufacturing industries in a misunderstood thrive for industrialisation and suffer the consequences now.

The greatest opportunities for the development of downstream processing industries exist in agriculture and forestry, but only the proper management of the resource sectors creates a base for their exploitation.

Applied to the agricultural sector, the meaning is to keep a high standard of extension services to small holders and peasants with the aim to stimulate the cultivation of products in a variety and quality required by the market and industries. Agricultural prices cannot only be stabilised for export crops. Marketing organisations should be supported to assume a regulatory function between supply and demand (storage facilities) to smooth out high price fluctuations and encourage peasants to produce in excess of their subsistence requirements.

Industrial processing industries can only be promoted when the resource base guarantees the uninterrupted supply.

An action plan is drawn up to promote the projects of immediate concern. Even the most sensible project has a long lead time till it reaches the stage of implementation and 10 to 18 months may be required to see the first results.

II. INTRODUCTION

The last decade did not bring the breakthrough in the economic development of Third World Countries. The declining raw material prices which have been experienced since the mid eighties and the deteriorating terms of trade as a consequence, slowed down the economic rate of growth particularly in countries relying on the exportation of their unprocessed raw materials. Papua New Guinea is no exception and has been even harder hit by the prolonged Bougainville Crisis, which deprived the Country of 35% of its export earnings, 15% of the government revenues and 8% of its GDP. The disruption of the economic activity in the North Solomons and the cost of military intervention, forces the government to re-allocate its financial resources and restrain public expenditures in areas where these funds are badly needed to support the country's development programme.

Positive signals went out from the mining sector, and the discovery of oil and gas fields gives hope for a brighter future.

The mining and petroleum sector will take the lead in PNG's economic development for years to come. The government is conscious of the depletion of its non renewable resources and is determined to create a business climate which favours other economic sectors to follow suit in order to achieve the ideal of a balanced economic growth.
To create the right atmosphere for private foreign investors, the government is reviewing its policy and incentive schemes with a view to favour investments in those sectors which have not been brought up to their full potential in the past.

It is the aim of this fact finding consultancy to identify projects in the manufacturing sector which can be developed in order to broaden the industrial base of the economy and offer the best prospects for a sustained viability in the international competition.

Various studies, pre-feasibility studies and project ideas have been submitted over the last ten years.

The proposed projects will be reviewed in the light of the priorities set by the PNG government, the competitive advantages they offer PNG in the World Market and their contribution to the overall development of the country. Incentive schemes and promotional measures will also be scrutinized in view of attracting potential investors.

III. SOCIO-ECONOMIC INDICATORS

Papua New Guinea is still a rural peasant society rooted deeply in its tradition and culture.
The process of industrial development has not left PNG untouched and the country is in the state of a slow transition to an urban industrial society. It is in the best interest of PNG that this process is controlled and guided in a way to minimize frictions and serve the people of the country. Industrialization is not a goal in itself but a means to help the people to lead a materially better life, achieve more fulfillment and free themselves from the constraints of poverty. In economic terms - to increase the state of welfare to the entire population.
These aims are laid down in the five directives of the constitution:

- Integrated human development
- Equality and participation
- National Sovereignty and Self-reliance
- National Resources and Environment
- Papua New Guinean Ways

Papua New Guinea has been endowed by nature with a unique geographical position and rich natural resources which give this country many advantages over other developing countries but constrain it in many ways at the same time.

The country extends over 462,800 sq km and has a population of around 3.7 million (3.64 million in 1989) The population density is low. Only the National Capital District is densely populated with 642 inhabitants living on one sq km, the density in the province is highest in the Western Highlands where 37 inhabitants are living per sqkm (compare Table 1, annex).

The economically active population, i.e. the population between 15 and 65 years of age is estimated at 2.08 million.

The share of the economically active population entering the formal employment sector is only 12.1% or approx. 252,000 persons, the majority remaining in the informal sector. Based on the average birth rate of 2.3%, fifty thousand persons are entering the labour force annually, whereby the formal sector takes up only 6,000 and the informal sector 44,000.

The gap of employment between the formal and informal sector is widening. It appears difficult to create 6,000 additional jobs per year in the formal sector only to keep the existing distribution at the same level.

The majority of the population remains outside the modern sector and benefits only marginally from the integration into the monetary system through local markets, transfer-payments and casual employment.

The informal sector may often be adversely affected by the unwanted side-effects of industrialisation and mining without reaping the benefits hoped for by the spin-offs.

The National Accounts Statistics must be interpreted in the light of the imbalances between the formal and the informal sector.
The Gross Domestic Product (GDP in1988 at current prices) has been K3,092 million. (K2,443 million at 1983 prices), see Table 2 and 3, annex.

The contribution of the subsistence sector to the GDP has been estimated at K 422 million.

The average per capita income at constant prices has been calculated at K 679. If allotted to the respective sectors one can state that K4,800 per capita has been earned in the formal sector and only K138 in the informal sector.

These deliberations lead to the conclusion that the purchasing power is overwhelmingly confined to the formal sector, comprising only a very limited number of people. People with a higher purchasing power are living in urban centres. The rural communities offer limited markets for manufactured products, because of the low purchasing power, though there are substantial seasonal fluctuations related to the harvesting cycles.

These structural features of a dispersed population with varying incomes account for the atomisation of an already small inland market into numerous widely scattered localised markets. To invest in these fragmented markets and follow a policy of import substitution is an extremely difficult task in a country like PNG.

It is therefore not astonishing that investments in remote parts of PNG were lacking behind expectations and were only sparked off when major mining ventures came on stream.

Despite these constraints on the economic development of PNG, the economy has gained momentum and the structure of the economy has changed (see Table 4 annex). The agricultural sector has declined from 40.1% in 1970 to 30.3% in 1988, Mining and Quarrying, without any importance in 1970, increased its share since 1975 and reached 18.2% in 1988. The manufacturing sector improved its position from 5.3% in 1970 to 10% in 1988.

The weight of the sectors contributing to the GDP will continue to change over a longer period of time with the mining and

manufacturing sector gaining. The sector Community, Social Services & Others has been stable over the years. The social requirements of the rural population will eventually necessitate higher expenditures in future and its weight may also increase.

Employment opportunities will be found predominantly in the agricultural sector, which absorbs already the bulk of the informal employment.

Largest formal employer is the public sector, employing 84,810 persons or 39.6% of the formal sector's work-force.

The capital formation in the private sector may serve as an indicator for the job creating potential in the different sectors and the expected growth in the corresponding industry.

Private capital expenditures are shown in Table 5 annex. Private investment has grown from K330 million in 1984 to K517.5 million in 1988, i.e. a growth rate of 56.8% in four years or an average rate of14.2% per annum. The distribution of the capital formation in 1988 indicates the mining sector in the lead with 54.2%, followed by the Wholesale and Retail Trade at 14.6%. Construction occupies the 3rd place (7.4%) followed by manufacturing in 4th place with a disappointing 5.6%.

The opening of mines is followed by the expansion of construction and trading. This expansion is unfortunately only of a temporary nature since the high level of employment is only maintained during the construction phase of the mines and considerably reduced thereafter. Manufacturing is bound to follow suit, but with a considerable time lag and through a smaller multiplier effect, because the immediate needs are satisfied mostly by the importation of goods and services.

PNG's Economy is highly integrated in the foreign trade. PNG exported goods valued at K1,276 million in 1988, corresponding to

41.3% of its GDP and imported goods at K1,093 million. The principle exports are given in Table 6 annex .

The mineral sector is in the lead with 68.3% in1988, followed by agriculture with18.9% in 1988.

Forest products account for 7.9%, other, mostly re-exports, for 4.3% and fish exports for only 0.6% in 1988.

All exportations consist of raw materials with the exception of palm and copra oil, exported as semi-processed raw materials.

The import pattern by commodity groups is shown in Table 7, annex. The lions share of importation consists of machines (32.3%). Manufactured goods (18.3%) are in second place followed by food (17.17%). Fuel and lubricants are in a modest position (11.24%) but the volatility of the market may well rank it higher when world oil prices increase.

Import substitution on a large scale seems neither possible nor desirable at present, given the diversity of products which are imported in relatively small quantities.

Import substitution may be possible in resource based sectors like the food industry, wood based industries, fish, and eventual in petroleum refining.

It may not be desirable to reverse the high integration of PNG into the world economy.

Taking into account the limited size and the fragmentation of the PNG inland market, the manufacturing sector offers already an impressive variety of products, as can be seen from the list 1, annex. The major contribution comes from the food, beverages and tobacco industry which generates 54.6% (1986 statistics, Table 8) of the sector's value added, followed by the basic metal industries

with 17.4%. Wood and Wood Products are in third place and reach 15.1%.

The % share of the value added related to the output of the manufacturing industries is relatively high and shows a mature stage of the individual firms.

41% of the food production's output is attributable value added of this industry.

Wood and Wood products achieve close to 60%, which can be regarded as normal in this branch.

The share of 45.8% achieved in the basic metal industry is relatively high, taking into account that this industry relies heavily on imported materials.

The overall judgement of the manufacturing sector - its variety of products offered in the market, but still low contribution to the GDP of only 10% - may lead to the conclusion that a certain saturation has been reached in the inland-market at the present stage of the economy's development.

The macro-economic view alone however does not suffice to judge the potential of this sector.

Manufacturing in PNG is still regarded under the perspective of import-substitution. It is hoped that it will also assume the role of exploiting export potentials whenever the opportunity arises.

IV. EVALUATION CRITERIA FOR THE PROMOTION OF PROJECTS IN THE MANUFACTURING SECTOR

The cost benefit analysis is the only correct method to evaluate a development project. But the statistical base needed to elaborate feasibility studies does not always comply with the requirements of a cost benefit analysis. In the absence of the necessary data, it is helpful to define criteria which follow more the common sense than an elaborate system of evaluation. It does not mean that all facilities should not be exhausted in order to arrive at a thorough quantitative analysis prior to the decision making process about the final implementation of a project.

To arrive at an a priori judgement two distinct sets of criteria will be applied, the micro economic and the macro economic view.

A. The micro economic view

Any project in the private sector is determined by its profitability, which may be measured by its financial rate of return. A satisfactory financial internal rate of return in PNG will have to be higher than 20%.

After the profitability of the project has been established, the basic assumptions have to be reviewed pertaining to their viability and reality.

The three micro economic criteria may be summarized for easy memory as the 3 M, i.e. Management, Market and Money (Financing).

1 Management

Is a chosen Project manageable, will expatriate management be employed and after how many years will it be phased out?
Is the organisational set-up reasonable within the economic environment of the country?

Are assurances be given and proved by an established reputation of the promoters that the technical management and the proposed production process will be in line with the requirements of the markets envisaged and the financial means avaiiable?

The chosen technology is often the the decisive factor and special attention must be paid to obtain a maximum of transparency about the technologies available for a specific production process.

2. Market

Is a market-study established to substantiate the demand for the product or product range under consideration? Given the very difficult market situation in developing countries and the small portion of the population employed in the formal sector of the economy, simplistic market-studies based on hypothetical per capita consumption rates are unacceptable.

The export market needs a different approach. The main determinant is the world market price if a standardised product with given technical specifications is under consideration.

In the case of manufactured items, the situation will become more difficult and even a thorough study normally contains a high risk of uncertainty. Whenever the production is meant to be for the local market and exportation is considered in addition, due attention must be paid to the inland-market. For manufactured products, the inland-market is often the backbone of the industry. In case the industry can count on a strong inland market of over 60 to 70% of its maximum output, the chance of success will be far higher than in an overwhelming reliance on the world market. The break-even point should be at least reached with the production saleable in the home country. It is common practice to calculate the export price of an exportable manufactured product below its average cost in order to compete in the world market. It is therefore essential that all

overheads are covered by the sales revenue achieved in the inland market.

3. Financing

The availability and the composition of capital is often the crucial point of a newly founded industry. Under normal circumstances, the ratio of risk to loan capital of 1:2 is acceptable, whereby the inclusion of permanent working capital requirements into this financing structure may be decided on a project by project basis. Fixed assets should not be financed with short term loans. The term loan financing of capital assets ought to be in line with the amortisation schedule. Short-term financing should not exceed the working capital requirements, even if the cash-flow projections encourage a different financial structure.
Special attention must be given to offered supplier's loans. Prior to accepting this type of finance, there are several hidden problems to be contemplated as:

- The currency in which the loan is offered. Currency fluctuations may pose a heavy burden on future repayments, if the respective currency appreciates.

- Interest rates, which are offered may be too high. Can the loan be obtained cheaper from local sources or can soft-loans be arranged from foreign aid donors?

- Which is the rate of the foreign credit-insurance to be calculated?

- Can price reductions be negotiated with the supplier? A certain risk factor may have been calculated and the equipment may be obtained at a cheaper price if independent financing can be arranged.

- If promoters are not in a position to satisfy the lending agencies, loan guaranties may be requested by banks from the government

or the Central Bank, especially when the financing of larger projects are at stake.

B. Macro-economic criteria

Macro-economic criteria follow principles which are best reflected in the cost-benefit analysis. The social rate of return is accepted as yardstick whereby it has to be decided which minimum rate, say 10% or 15% is considered acceptable. But as already discussed, Macro-economic criteria will be used instead, based on key indicators which are of a quantitative as well as a qualitative nature.

1. Employment

Employment is one of the key indicators. It is desirable to maximise the employment per Kina invested. The rate of capital investment per employee shows how effectively this aim can be reached for the project in question. The employment effect may also influence the choice of the offered technology, giving preference to a labour intensive technology over an automated process.

2. Value added

The value added generated by an industry is often regarded as a key indicator. This view is only correct in the rare cases where foreign exchange expenditures are negligible. If the industry under review operates in a protected environment, the incidence on the balance of payments has to be taken into account.

3. Incidence on the balance of payments

The foreign exchange outflow will be calculated as the total of:

- FOB value of exportable raw materials.
- CIF value of imported materials.
- Interest payments in foreign exchange to serve foreign loans.

- Any transfer payments in foreign exchange in connection with the production.
- Annual depreciation of the CIF Value of imported machines and equipment.

To offset the outflow of foreign exchange, the savings of it will be calculated as the total of:

- CIF-value of the part of the total annual production replacing imports.
- FOB value of the annual production to be exported.

The foreign exchange balance of the inflow and outflow may than be related to the value added of the project under review.
Experience has shown that capital intensive projects may turn into foreign exchange losers for various reasons and particular attention should be given to the impact on the evaluation of the potential foreign exchange earnings/savings position.

4. Transfer of technology and management know how

Transfer of technology and management know how is an important qualitative factor in development but this aspect should not override the quantitative criteria of a project.

5. Environmental impacts

Environmental impacts are often difficult to assess. The more apparent social problems tend to overshadow the environmental issues and less priority than they deserve are often given to them.
Environmental impacts can be costly in the not too distant future and may turn out to be irreparable.

The negative example given by the industrialised world should be a warning to the developing countries to avoid a repetition of the mistakes so clearly demonstrated.

V. PROJECTS AND PROJECT IDEAS UNDER CONSIDERATION

Not all projects under review are backed up by documented feasibility studies. Many are only ideas which need further investigation and eventual study if found interesting. Only a few documents can be regarded as up to date, all others need to be re-introduced again for further appraisal in the light of past changes and developments. Above all, potential investors themselves should guide the evaluation process. A project study without the involvement and eventual commitment of a promoter is only of academic interest. The attraction of final project studies to investors is very often overestimated. Serious industrialists conduct their own research and are more in need of basic information pertaining to a countries economic data than a final analysis.

A project should suit the promoter like a costume and it should therefore be custom tailored to his own needs. The project idea is followed by the identification of a promoter and the study will than be part of the implementation programme.

The following projects and project ideas are listed and described according to sectors and specifications within each sector.

A. The agricultural sector

1. Tree crops

Tree crops are the most important agricultural exports, accounting for 84% of all agricultural and of approx. 16% of PNG's overall exports. To exploit ways and means to obtain the maximum benefit by further processing of these crops inside PNG, is in the natural interest of the country.

1.1 Palm oil and coconut products

Palm oil accounted for K 32.9 million. or 14% of the agricultural exports in 1988, the quantity being 102,591 t. (Table 6 and 8, annex) This product offers a wide range of applications in the form of refined edible oils, shortening, cooking fats and non-food uses ranging from toilet/laundry soap to shampoos, resins, paints, plasticisers, to name a few.

The quantity of available palm oil in the country should attract potential investors interested in the processing of this material within the country. The inland market however offers little attraction.

The importation of edible oils is highly diversified and the overall market is rather small. Total imports were 3,155 tons in 1987 at a value of K 2.6 million (Table 12, annex).

This market alone does not support a modern industry, leaving apart the variety of products which are now available in the market. The household cooking oil, blended with different oils takes up 66% of the market with a volume of K 1.7 million. Margarine has been imported at a volume of K 5.4 million. in 1987. The quantity is around 6,100 t (1987), whereby household margarine and fats account for 2,000 t and the rest is statistically classified as unspecified imitated lard. The growth rate has been an average of 14.4% per year from 1981 on with high fluctuations till 1984 (Table 12, annex).

A margarine production on the basis of locally available palm oil and copra oil should be studied within the wider context of export markets.

The market for margarine is dominated by multinational manufacturers which have created their own brands in an oligopolistic market. The reliance on a protected inland market alone

does not suffice to attract any serious investor in this field. The penetration of the world market is extremely difficult and marketing costly. To invite the leading manufacturers (UNILEVER, PROCTER & GAMBLE) and main consumers of palm oil and also coconut products, appears to be the most practical approach.

The product-line deviated from coconuts is equally impressive and gives support to the idea of a search for a processing partner combining the exploitation of the two tree crops, palm-fruit and coconut. The difficulties of the narrow inland-market may be overcome by the free access of PNG manufactured products into Australia and New Zealand and the advantages offered by the LOME Convention.

Promotional efforts will have to be made to attract the leading industrial partners in this field. Information to be provided to potential investors must not necessarily be backed up by extensive studies but can be confined to market-statistics, the offered incentive schemes, taxation and foreign exchange regulations. Feasibility studies are normally established by the interested party and rarely accepted from outside consultants when they are drawn up beforehand without any relation to the interested partner.

The total production of coconuts were 1,086 million pieces in 1988, corresponding to 181,000 t of copra. A comparison of world market prices for copra and copra oil shows a difference of approx. 10.4%. (see Table 13, annex). The prices for both commodities were falling at the same rate between August 1989 and August 1990.

Downstream processing of coconut-products e.g. non refined oil to refined oil is no hedge against falling raw material prices.
The further processing of coconut oil into refined oil in order to achieve a higher value added and surplus of foreign exchange must be carefully studied. The world market price for processed and non processed oil related to the local production cost will be the basis

of evaluation. However the downward trend of the coconut prices has also affected the products derived from this crop.

Various other direct consumer products can be produced from coconuts such as coconut cream.

Coconut cream is a novelty in western cooking through lack of familiarity and lack of promotion. It is derived from the fine chopping of coconut meat which produces a thick cream. The thickness varies with the refinement of the processing. The cream can be thinned by adding water to the required viscosity and be processed into a beverage. The production of coconut cream does not require a large scale manufacturing plant and can be started on a modest scale.

Dehydrated coconut milk, with full oil content is already marketed in Sri Lanka and Malaysia.

Desiccated Coconut is the best known coconut product in western countries, widely used in the biscuit and confectionery industry. The production of desiccated coconut is possible on a small scale, and production can be conceived also for the inland market alone.

The question, whether PNG has a comparative advantage of processing this crop on a large scale, must be studied in the context of the promotion of these industries with potential know-how and marketing partners.

Also the various minor products which can be derived need considerable marketing efforts.

If no further progress can be achieved to produce vegetable oils also for the local market, bulk importation, filling and packing may be examined. Savings can be achieved in case of bulk importations through lower transport cost. The process is technically unsophisticated and the closeness to the market an advantage.

Packing can be done in small quantities to serve customers with limited storage facilities in their homes, and low purchasing power.

The processing of coconut shells into charcoal can be a viable proposition. At the weight of 0.45 kg per coconut shell and an annual production of 1,086 million coconuts, 510,420 t of the shells must be available at the crushing plants. Charcoal is used in the gold extraction process and can be sold to the mining industry. Charcoal is also an excellent household fuel and may find a good market in urban areas where firewood is in limited supply.

1.2 Coffee

Coffee occupies the second place in the 1988 agricultural export statistics. Apart from insignificant roasted coffee-exports, coffee is processed in PNG to the stage of green beans and exported in this form. The quality of the coffee arabica is excellent (very little robusta is grown in the country). Small quantities of locally roasted coffee are sold in the Australian and New Zealand market as specialty. The chances of exporting a sizeable portion of roasted coffee are not evident. Coffee roasters take advantage of the closeness to the consumer market and blend the coffee from different coffee growing regions. However, the efforts of private PNG coffee roasters to find their niche in foreign markets deserve encouragement. Especially the increasing market in the industrialised countries for organically grown coffee gives rise to hopes in PNG, where practically 95% of the coffee can obtain the qualification "organically grown". Coffee, roasted and packed in PNG, can find a niche in specialty markets in foreign countries with some marketing efforts. One coffee roaster in Goroka has started to export vacuum packed roasted and ground coffee to Australia and New Zealand. The possibility of increasing this market should be explored.

A study on the implementation of a soiuble coffee project has been done by the Japan Consulting Institute in 1973. The capacity

proposed in a three shift operation is 1,000 t p.a. The consultant suggested to start with one single shift. The study is outdated and will have to be repeated by an interested promoter. The importation to date is around 400 t p.a., a low quantity for a soluble coffee plant. The export potential of soluble coffee faces the same problems already discussed in the downstream processing of coco-nuts. The investment has only a chance of success with a potent know-how and marketing partner. In contrast to the processing of palm oil and coconuts, the production of soluble coffee in PNG on a larger scale appears less favourable due to:

- the premium price, PNG arabica coffee achieves in the world market

- the high competition from soluble coffee manufacturers with lower quality coffee inputs from other parts of the world.

The free access to the Australian and the New Zealand market is of course in favour of this industry.

If the instant coffee piant has to rely entirely on the inland market of PNG, the availability of the technology for an appropriate small plant should be studied. To produce 400 t of instant coffee p.a, an input of 1,520 t of green beans is necessary, or 3.4% of PNG's coffee exports in 1988. Low grade coffee beans at reduced cost should be available to meet the production requirements at this scale.

1.3 Cocoa

Cocoa is PNG's third largest crop (19.5% of the 1988 agricultural exports). World market prices for this commodity have been declining dramatically since 1985. The possibility to convert part of the country's crop into semi finished products or products with a higher export value, has given reason to order a study done in 1986 on the further processing of cocoa into cocoa liquor, coco butter and cocoa cake

The study offers three alternatives, an integrated processing plant with 6,000 t of beans with an initial investment of K 4.0 million and working capital requirements of K 1.5 million, an integrated extended processing plant with the additional capacity to process 2,000 t of subgrades, requiring an investment of K 4.7 million and working capital of K 1.6 million. The study gives the best chances of success to a reduced investment of only K 1.5 million and working capital of K 117,000.- for a sub-grade processing plant.

The investment proposal for a subgrade processing plant appears to be sensible as a first step into downstream processing of this crop. Experience can be gained in processing and marketing and an extension can later on be planned on a more realistic basis. To venture into an integrated cocoa processing plant appears not yet justified. It is proposed to update the existing study in the light of the preference given to a subgrade cocoa processing plant.

1.4 Rubber

Rubber has been exported as "technical specified rubber (TSR)" in the form of dried cup-lump. It is a minor crop. Exported were 4,541 t at a value of K 4.4 million in 1988 (1.8% of agricultural exports). No study has been done to further rubber processing. There are minor applications, e.g. to manufacture items of natural rubber for local consumption and some attention should be given to explore these possibilities.

1.5 Fruits

A study on the production of fruit juices in PNG has been only recently completed (July 1990). The study proposes the establishment of 3 major juice production centres in Mt. Hagen (Citrus), Rabaul (Mangos) and Port Moresby (Pineapples). The importation for fruit juice has been in 1987 as follows:

1987 importation of fruit juice in ltr. value in K.

Specification	Volume in ltr.	Value in K.	ø price fob	ex-fact.price
Orange	419,30	4325,304	0.78	1.53
Grapefruit	17,896	25,971	1.45	
Citrus fruit	264,848	184,454	0.69	
Pineapple	194,968	90,262	0.46	0.83
Tomato	80,735	58,217	0.72	
Apple	104,388	75,385	0.72	
Grape	15,129	15,971	1.06	
Fruit Juice NES	304,782	181,303	0.59	
Pawpaw				1.18
Mango				1.83
Guava + Passionfruit				1.99

The proposed ex-factory prices do not compare favourably with the import prices though some allowance must be given for freight and insurance on imported items. The study suggests input prices for fruits which are unrealistically low, i.e. for mangos K0.20/Kg, oranges K0.10/Kg, Passion fruit K0.13/Kg, Guava K0.13/Kg and Pawpaw K0.08/Kg.

The fixed investment proposed for the three fruit juice manufacturing centres is estimated at approximately K4 million.
A fruit juice industry can be established if plantations are available to deliver fruits at a quantity which allows the manufacturer at least to break even. The additional supply may come from smallholders. To rely on smallholders for the larger part of the supply is too risky. If the policy is pursued to establish a juice factory to replace imports, the organisation and collection of the corresponding fruits have to be organized beforehand and if proved satisfactory, a juice extraction plant can be established.

It is cheaper to buy and even destroy one season's fruit crop in order to prove the viability of a similar project than invest into an uncertain future.

Fruits are expensive in PNG's urban centres and to organise its steady supply will be rewarding and can lead to a steady built up of fruit supplies to justify fruit extraction plants in the future.
To start with three different juice plants at one time, appears premature at the moment.

Pineapple canning has been proposed for the Mt. Hagen region. The market for pineapples is highly competitive and PNG is not likely to have a comparative advantage to produce this fruit for industrial processing. The sugar price adds to the difficulties. If conceived as an import substituting industry, it will need a high protection to forestall imports. But it may than be difficult to compete with the locally available fresh pineapples.

The importation of jams and marmalade suggest its replacement by a local jam and marmalade production. 208 t of jams for K246,928 and 27 t of marmalade costing K35,542 were imported in 1987. The market justifies a small production unit. Certain arrangements will have to be made to offset the high sugar price in PNG. Any sugar consuming industry in PNG must overcome this handicap in order to compete with imports.

2. Other agricultural crops

2.1 Vegetables

The Highland's vegetable production could meet the demand of the urban centres of PNG. Vegetable marketing organisations face organizational and logistical problems to collect the merchandise from remote areas and to ship the perishable product to towns without major losses. Various opportunities exist for small businesses to intervene in this market. Pre-preparation, portioning and packing prior to shipping by air to Moresby or Lae can create some employment in the provinces. Plans existed to establish a small unit near the airport in Wapenamanda/Enga under the management of the Enga Vegetable Marketing Depot in Wabag/Enga.

The proposal to set up a potato processing factory in Wabag/Enga has also been presented. No feasibility study has been elaborated nor were technical parameters established. Enga's production of potatoes is volatile, the supply depending on the price expectations of the smallholder farmers. The minimum price per Kg. expected in Enga can be set at 20 Toea, while an industrial plant cannot accept a price higher than 5 Toea. The variety grown is of excellent quality but not quite suitable for the preparation of potato chips. The local demand of some kai bars is relatively low and can be satisfied by a cottage type industry or even by home preparation. The prices for potatoes are well above the acceptance level of an industrial plant.

Smaller potato chips plants are already in operation in PNG and the development of smaller decentralised units should be given priority, abandoning the idea of a centralised export-oriented potato processing plant, at least for the near future.

2.2 Pyrethrum

Pyrethrum is mainly grown in Enga (Sirunki area) and processed in Mt Hagen. The existing Mt. Hagen based plant suffers from under-utilisation of its capacities. The machinery and equipment are in need of renewal. There were plans to relocate the plant into the pyrethrum growing area. Studies are also under way to explore the possibility of manufacturing mosquito coils. The main problem at the moment is to motivate smallholder farmers to plant pyrethrum in sufficient quantity to allow the extraction plant to function profitably. Manufacturing of mosquito coils is a technical process which can well be adapted to a small inland market and can also be expanded to meet potential export requirements. Mosquito coils are mainly produced in south-east Asian countries. The local availability of the raw material may give PNG a comparative advantage in the production of a high quality product made of natural pyrethrum, which is higher rated than the synthetic product which is also used as insecticide in mosquito coils.

2.3 Spices

PNG grows a variety of spices (Cardamom, Chillies, Pepper, Ginger, Nutmeg, Mace, Bixa, Turmeric) and the establishment of a spices mill appears a viable proposition. A spices mill can be established with a low capital input. It may principally aim at the inland market but with marketing effort, a PNG specific brand name can be established in the Australian and New Zealand market. Ginger processing can be integrated in this project. Export to Asian markets may be possible.

3. Life-stock sector

Life-stock statistics in PNG report only on largeholdings, which are defined as satisfying one of the following criteria:

- having an area of 10 hectares ore more
- having 50 or more heads of cattle
- having 100 or more poultry birds
- having 50 or more pigs

As indicated in table 14, Life-stock on largeholdings dairy cattle holdings are insignificant with 781 heads in 1986. Beef cattle holdings reach about 68,000 heads. Pigs account for around 15,000, sheep for only 3,100 and goats are of practically no importance with approx. 200 recorded. The poultry population was around 1 million birds in 1986. Poultry farming and pig-raising is an important small-holder activity, but no statistics exist on this animal population. Pigs raised on the village level are fed from locally grown food, mainly sweet potatoes, while small-holder chicken farmers rely on feed preparations. Village fowls to be left in search for their own food are rare.

The beef herds are concentrated on the Northern Coast (Morobe, Madang) with 59% and the South Coast with 18.9% (mainly Central incl. National Capital District).

The same holds true for the largeholding pig raising farms. 35% are on the South Coast and 59% on the North Coast.

3.1 Chicken

PNG is self sufficient in the supply of poultry products. The market is dominated by New Guinea Table Birds, based in Lae and Elimo Farm in Port Moresby. Local farmers may have flocks of up to 300 birds. They offer the chicken "life" in local markets. Chicken from local farmers are often preferred to processed ones and achieve normally higher prices. To serve the small local farmer with processing facilities, is the idea of a Poultry Processing Plant to be installed in Mt. Hagen or Kundiawa.

The estimated consumption of processed frozen chicken in the highlands is 70,000 per month of which the project hopes to gain 50% for its own exploitation. To promote this idea, the consumption estimates must be substantiated and also the availability of the quantity of chicken offered by smallholders at a price allowing to compete with the processed birds, which have already penetrated the market.

The establishment of a chicken farm with integrated processing facilities has a better chance of success.

Apart from the production of broilers, the egg production may be more rewarding, judged by the price for eggs, and should be studied in depth for the highland region.

3.2. Animal feed

Animal feed is partly imported, the quantity has more than doubled from 1981 to 1987 in monetary and more than tripled in real terms (see Imports of Animal Feed, Table 15). In 1987, 7,334 t of feed were imported at a cost of K4.3 millions. Two feed mills exist in Lae and their import of raw materials is recorded under different

statistical headings. The import volume of basic raw materials intended to feed animals is far higher and efforts should be undertaken to replace the imported raw materials by local products wherever the economic feasibility is given. It is therefore a logical consequence to promote a stock feed mill based in Port Moresby. Ingredients, like maize, mill run, copra, cake meal, and palm oil are locally available.

The Zooconsult study, submitted in November 1989, proposes a commercial feed mill with a fixed investment of K2.9 million, and a start up production of 19,000 t of feed per annum.

It is worth considering whether the economies of scale favour a larger unit or the transport cost advantages several smaller feedmills in different locations.

If more large scale chicken farms develop in the highlands, it may be more rational for these farms to develop their own formulas for feed, based on the locally available raw materials, and attach a micro feed mill to their farm.

3.3 Processing of hides and skins

A study on the processing of hides and skins indicates the possibility to start a tannery in Lae for 10,000 hides to be processed to the stage of wet blue for export. A ready export market for this semi finished product exists. To promote a local leather industry, an additional hair-on tanning unit is proposed for Bulolo. There is also a strong indication that enough crocodile, snake and lizard skins are available tc justify a medium size reptile tannery. The fixed investment cost for the Lae tannery are estimated at K754,000.--, the Bulolo tannery at only 24,000.--, no investment cost are established for the reptile tannery.

A note of caution must be struck concerning the tanning of crocodile skins. Crocodile skins are expensive and the personnel must be

highly skilled and well trained. A close relationship to consumer markets must be established in order to react to the fast changing fashion of designs and colours.

The low level of investment may allow an easy access into this venture, which deserves all attention in the light of the low import content, the chances of exports and the utilisation of locally available raw materials.

4. Minor livestock projects

4.1 Honey processing

The total importation of honey, originating from Australia in 1987 was only 2.6 t at a value of K5,400.- A honey collecting and processing centre is proposed for Kundiava. The production of 400 t of honey is envisaged, whereby 100 t are to be offered on the local market and 300 t available for export sales. No initial investment estimate is available but the investment cost are normally low and the industry is not fixed to a minimum production level. Though the world market for honey is highly competitive, PNG may have a specialty market and the relatively low production, as seen in a wider context, may find its niche in this market. This village industry should be given all support needed to take off.

4.2 Snail processing

The proposal to raise and process snails came from a promoter of a Rabaul based farm. The project has a negligible initial capital investment of only K25,000.-- The process is labour intensive, counting on the employment of 200 factory hands. Snail meat can be entirely exported to France. If found feasible, more projects can be promoted in this line.

B. Forestry sector

Concern about the rapid disappearance of the world's tropical rain-forests and the impact on the macro climatic condition casts some doubt on the unchecked exploitation of the forest reserves in all countries. Though PNG disposes of substantial reserves, it will have to limit the exploitation of this resource to its natural rate of reproduction and the harvesting of forest plantations. The latest World Bank Report on the Forestry Sector (The Forestry Sector: A Tropical Forestry Action Plan, October 1989) proposes major legislative changes and forest-management actions before any plans for the successful exploitation of the country's forest-reserves can be implemented. A moratorium on logging has been imposed following the discussions of the World Bank Report.

Major projects which draw on the remaining forest resources will have to become an integral part of an action plan which protects the forests of the country from over-exploitation.

The export of forest products was K98.4 million or 7.9% of the total export value in 1988. 92% of the wood is exported as logs, the rest as sawn timber and woodchips.

The domestic market consumes about 150,000 cum p.a. of locally produced timber, and 18,000 cum p.a. of plywood. The installed sawmilling capacity, consisting of about 5o stationary mills, is of 500,000 cum p.a. This corresponds to a third of PNG' entire log harvest. 20 mills have a throughput capacity of more than 20,000 cum per annum. These mills process 60% of the log input in PNG. A plywood mill produces 15,000 cum plywood p.a. for the internal market.

A number of Joiner factories exist mainly in conjunction with building companies. Seven furniture manufacturers operate on a commercial scale.

The Japanese Company Jant operates a woodchip factory in Madang.

The World Bank Report claims that the PNG processing sector is internationally non competitive due to:

- high labour costs

- high energy cost

- high internal and external freight cost

To overcome these difficulties and to implant competitive forest based industries, the Report proposes three feasibility studies on:

- an efficiency scaled integrated sawmill/manufactured board plant strategically located in order to minimise costs

- a chipping operation based on plantations

- a pulp mill, also based on large scale plantations

Apart from these proposals, it is sensible to review the existing industries in this sector. There appears to be scope for the introduction of modern designed furniture at good quality for the internal luxury market but also for the export market in the higher category. At the variety of tropical hard wood species available in PNG, an industrial parquet plant to produce inlaid floor tiles can find a ready export market, provided the quality is correct.

The World Bank has recommended to carry out a sector study by a mission from experts of the International Tropical Timber Organization (ITTO), the World Bank and UNIDO.
A study about the rattan growing potential in PNG has been presented in July 1990 (Environmental Forestry Development (EFD) b.v. The Netherlands July 1990).

Of the global rattan trade of 160,000 t in 1989, PNG exported only 500 t. Traditional far east suppliers impose strict export regulations in order to protect their own natural resources of this material.

Given the potential of the natural resources of rattan and assumed the development of the economic rattan resource, PNG could become a medium to major supplier in this market.

The study suggests a development, which is giving weight to a strategy of establishing conservation areas of parent material, plantation development and the integration of customary forest owners and dwellers into the scheme. Proposals for a Natural Rattan (Plantation) Development with a potential of 18,000 ha's for the Jama district (East Sepik Province) and an Estate in West New Britain have been submitted.

Rattan furniture workshops exist but their production is low and incidental depending on occasional orders. The problems are similar to those of the the furniture manufacturing industry. The first step to export successfully is quality control and design. If the raw material is made available, there is a good chance to built up a viable industry based on rattan to manufacture furniture in a "knocked down" stage in order to overcome the high transport cost for a bulky but otherwise light, finished product. The competing Asian suppliers will be a continuing challenge for this industry and some restrictions on the export of untreated rattan will have to be imposed to secure a competitive advantage to the local industry.

C. Fishery

Papua New Guinea's "Declared Fisheries Zone (DFZ) covers 2.3 million sq. km of the western Pacific Ocean.

At present the fishing industry plays a subordinate role in PNG. The export share is below 1% (0.63% in 1988). The decline of the fish exports from PNG between 1979 and 1987 can be seen from Table 16 in the annex.

The employment in the formal fishing sector is estimated at 450 persons in commercial fishing, an additional 470 in national and provincial institutions. 3000 to 4000 artisan fishermen in the informal sector earn their income from the supply of fish.

Approximately half of the artisan catch is delivered and sold directly by fisherman to urban markets throughout the country, the remainder of the coastal fish is handled by the coastal fishing operations. The consumption in PNG of domestic fish is estimated at16,400 t of which 75% is subsistence consumption. The urban demand probably exceeds supply. The difficult infrastructure and internal transport cost prevent a higher increase in the consumption of coastal fish in favour of the ubiquitous tinned fish.

Industrial Fisheries, based in PNG are practically confined to prawns and lobster fishing.

According to fishery's surveys, the exploitation of crustacean has reached its sustainable level and should not be further increased for protective reasons. The Fishery Review of January 1989, prepared on behalf of the UNDP Programme, sees a substantial potential in the exploitation of the Tuna Resources within PNG's DFZ.

At present these resources are exploited by foreign owned and foreign based Distant Water Fishing Vessels (DWFV).

Licence fees paid are low with K4.48 million in 1985 and K3.4 million in 1986 (see Table 17, annex), e.g. K60 per t. of tuna, or less than10% (the rate varies according to agreements between 6% and 10%) of the ex vessel price for tuna. The contribution to the economy is negligible and it is debatable whether PNG would not be better off to leave this resource underemployed till a national industry is established.

The sustainable harvest for PNG's DFZ has been estimated of 180,00 t. per annum. The harvest stayed below at 100,000 t per annum. The average weight in kg. per Skipjack and Yellowfin however has markedly declined to about 50% from 1970 to 1981. No explanation has been given (see Table 18, annex).

The implantation of a fishery industry faces some problems in finding foreign partners who are willing to invest into a full on shore processing line and a fishing fleet, operating from on shore facilities in P.N.G. Foreign vessels have found it more convenient to operate under license agreements and unload the fish for further processing wherever it is most economical and convenient.

Apart from Government incentives and concessions to foreign investors, which can be costly to the government and reduce the benefits to the economy, the most sensible approach is to limit licensing of foreign fishing vessels even at the expense of temporary losses of revenues from licence fees and invite fishing companies to enter into Joint Venture agreements with local firms or register a PNG based company who builds up the necessary infrastructure. If the accessibility to PNG's extensive fishing grounds is possible with the payment of a nominal licence fee, there is little incentive for a foreign fishing company to venture into a risky enterprise while its competitors take an almost free ride. If licences are restricted, the fishing area must also be effectively policed in order to protect the fishing grounds and the operating national enterprises.

FAO projections have indicated on a global basis, that demand for fish will continue to exceed supply. This trend is supported by world's population growth but also by an increasingly health consciousness which gives preference to fish over fat animal products.

PNG has an excellent role to play with her fish reserves, provided they are not exploited by licensed DWFV's.

Apart from an international fishing industry, emphasis should be laid on a local fishery to be geared to the regular supply of inland markets. It appears to be less desirable to substitute the cheap imports of canned mackerel as long as the product cannot be put on the market at a cheaper price. The supply of frozen fish at reasonable prices for lower income groups and the establishment of points of sale with refrigeration facilities would replace part of the tinned fish imports and provide a healthier diet to the consumers.

The Project Appraisal Report by DANIDA, from August 1986 suggests the involvement of local fisherman in the tuna fishing by equipping them with boats of less than ten meters in length powered by small diesel engines of 15 to 40 HP. The boats can employ the conventional pole-and-line fishing technique.

The UNDP Fisheries review makes allegation to Highlands acquaculture. There has been a history of experimental village and pond acquaculture in the highlands, dating from the1950's. Species of tilapia, gouramy, major and common carps were introduced. Trouts and trout farming was also launched. These efforts are worth to be taken up again with the aim to support the population with a better balanced diet. The water resources are abundant and acquaculture appears to be a good proposition to start small ventures mainly in the highlands.

D. Building & construction industries

1. Building materials

Official statistics show a decline of the construction sector between 1970 and 1987.

Contribution of the Sector Construction to the GDP
(1970 - 1987)

1970	1975	1980	1985	1988
12.9%	8.1%	3.8%	3.9%	3.6%

In a dynamic economy, the construction sector should be expected to be among the fastest growing sectors.

The production of locally available construction materials stimulates this sector.

The mining sector with the highest growth potential at the moment determines the level of construction in PNG by his direct construction requirements of the proper mining investment and by the subsequent service industries and necessary social services.

The search for the manufacturing of local construction materials is imperative for the accelerated economic development of the country. The constraints however are set by the market size and the technology applied in the manufacturing of local construction materials.

1.1 Cement

Various studies have been made on the possibilities to manufacture cement in PNG. Lime has been found in abundant quantity and good quality together with suitable clay in various parts of PNG and the

recent discovery of natural gas and oil reserves have given new hopes to an economical production of cement.

Major constraints to a local production of cement remained and can be summarised in these points:

- Large cement plants are operating in Taiwan, Japan, Korea and the Philippines.

- The economic minimum capacity for a modern rotary kiln plant is 200,000 t output p.a.

- The PNG cement market in PNG is well below the minimum capacity of 200,000 t and has shown considerable fluctuations in the past.

- Internal freight costs.

All studies presented were not able to prove the production of cement at internationally competitive prices or the capability to reach the break even point at an acceptable price with the locally consumable quantity of cement. Table19, annex, shows the high fluctuations of the importation of cement between 1981 and 1988. The demand of cement can be estimated to reach 100,000 t in 1990 and may increase in the following years eventually to 150,000 t. The irregular demand for cement is explicable by the new construction of mines which increase the demand for cement over a certain time period to taper off again when the mine is built. With a new construction the cycle starts again. There is little chance of a smoothing effect by a great number of less important consumers of cement. Any industrial production process needs a continuous demand for its product. To increase the demand of cement, Government could make a commitment to use cement to a larger extent in road construction.

Three major proposals for the establishment of cement plants were submitted recently.

The Cement Lime Co. Ltd. presented a study of a combined lime and cement plant for Porgera or Tari at the total investment cost of K70 million (including K10 million working capital).

The financial data base of this project is insufficient to assess the viability of this proposal.

The Porgera/Tari area offers the advantage of the availability of natural gas and gypsum in addition to the necessary and proper lime stone. Gypsum is won in the gold extraction process as a waste product at the Porgera mine. However, doubts have been expressed about the purity of this gypsum and its suitability as an additive in the cement production. The expensive road transport to coastal customers is a severe disadvantage.

Holderbank Consultants, Switzerland have drawn up a study for the German machine supplier O & K (Orenstein & Koppel) with a coastal based plant, but the consultant himself doubted the feasibility due to "widely fluctuating demand in an erratic manor, making predictions of future demand difficult - typical for a low consumption market with irregular large projects". Even a simulated reduction of the investment cost by 25% did not improve the performance of this project up to the stage of profitability.

Halla Engineering & Heavy Industries Co. Ltd., Seoul, South Korea further proposed the erection of a clinker mill in Lae, Morobe Province at the cost of $US 37 million. The capacity is also 200,000t.

PNG would be dependent on the supply of clinker in this case and the value added in the production of cement in PNG would be reduced to a minimum. Further studies are essential to assure the viability of the project and the predicted savings of foreign exchange. High initial

capital cost and financial charges can easily cause foreign exchange losses.

In the light of the natural gas exploitations in Tari, the feasibility of a smaller size cement plant for the highland region can be a viable proposition because of the high transport cost and the increasing cement consumption of the region due to the mining activities in Enga.

On the basis of a vertical kiln, a plant of 70,000 t capacity had been already suggested in 1983. This technology allows the economic production of cement on a reduced scale. The pre-feasibility study, presented by Gorresen's (AUST) PTY LTD should eventually be updated and a full feasibility report considered. The fixed investment cost were quoted to be US $ 8,2 million in 1983. This proposal appears still pragmatic.

The construction of a small cement plant may pave the road to a larger cement industry at a later stage, which may than be geared to export markets, provided the economic viability of this industry can be assured.

1.2 Bricks and roof tiles

Bricks and roof tiles are not manufactured in PNG and consequentially not used in construction. The availability of clay makes the manufacturing of bricks and tiles a possibility. Considerable savings in the use of cement can be achieved if bricks are used in spite of concrete or concrete blocks, apart from the attractive style of brick buildings. Bricks come in standard size as solid burnt clay bricks or large hollow blocks. Hollow blocks are preferred building materials in tropical countries, where the insulating properties against heat is appreciated. Brick plants are confined to a fixed radius of available consumers because of their specific weight and high transport cost. Brick plants can be conceived as a larger industrial production with tunnel kilns,

producing bricks of high standard in a continuing process, in smaller scale kilns with mobile diesel-burners (so called Hoffmann-Kilns) or even kilns built of raw clay bricks which are cooked while a wood fire is kept burning inside. There are manufacturing plants available with mobile kilns and mobile extruders and mixers mounted on low-loaders to be operated in different locations of clay deposits. Brick plants have a chance of success where an urban demand for construction materials within a reasonable radius of a clay deposit exists, say within a radius of 50 km. Depending on the price for other construction material, e.g. cement blocks, delivery to remote destinations can be economical. Industrial brick plants need mainly heavy fuel for heating and electricity supply for motor power.

Feasibility studies to establish the viability of brick plants and the availability of clay deposits are recommended.

1.3 Structural components

The manufacturing of heavy steel components in steel mills is not feasible at the moment, the same can be said for the fabrication of concrete steel. The chances for processing structural components lies in the bulk importation of construction steel and the processing of it in PNG. This is to a large extent already realised. Workshops exist for the fabrication of metal doors and windows. Also aluminium joineries can be found. With the growth of the economy, this type of industry, mainly concentrated in Lae and Port Moresby, will extend the activities closer to the consuming centres, as can be observed in the Porgera region.

1.4 Other building materials

In the production of various small construction materials , PNG like other developing countries at this stage has a small industry catering for the supply of minor construction materials such as nails, wire, barbed wire, fencing.

There is no industry to produce minor electrical appliances like plugs, switches, electric cables.

Sanitary items, apart from plastic pipes are entirely imported. The fabrication of sanitary items like toilets, lavatories, made of artificial marble (a cement mixture with polyesther resins) as well as the manufacture of kitchen and bathroom floor and wall tiles, made of the same material, should be explored. The technology can be obtained through the intervention of the Industrial Development Centre (]) in Brussels.

1.5 Prefabricated housing

A number of construction companies offer prefabricated houses, made of timber, in the urban centres and also in rural areas of the country. There seems to be some scope for improvement and the penetration of the market also for larger houses. To turn out homes at lower cost may be achieved by a joint venture with a foreign company in the field of prefabricated housing. The demand for standard type houses is particularly important in new mining areas.

E. Chemical and petrochemical industry

The discoveries of oil and natural gas in the country have been substantial during the last few years. The total gas reserves to date are estimated at 16 trillion cuft for PNG, whereby the fields of Hides and Angore alone hold an estimated 3.2 trillion cuft. The proven oil reserves are 170 million barrels but may increase with the current explorations under way.

These developments have given impetus to study the promotion of a chemical and petrochemical industry in the country.

Project ideas have been brought into discussion and a government committee has been set up to study the possibilities to exploit these reserves for the establishment of chemical plants and the use as

non-renewable energies in all industries which might be able to spring up with the availability of energy.

There are a multitude of ideas and for certain ventures pre-feasibility reports have been submitted. The majority of ideas however is still awaiting feasibility studies and, which is most important in the establishment of industries of a certain magnitude, know how partners in the corresponding fields with the commercial interest and willingness to cooperate, have to be identified and approached.

1. Production of sodium cyanide

Sodium cyanide is used in gold mines to recover gold from ore, using carbon-in-leach or carbon-in-pulp systems. The contained gold forms a soluble complex with cyanide in aqueous solution, from which it is extracted by activated carbon. The cyanide is recovered in the process, except for some losses to tailings, and recycled. After OK Tedi will cease its gold production, new goldmines coming on stream will be the consumers, such as Misima, Porgera, Hidden Valley and Lihir.

The Department of Minerals and Energy has commissioned Coopers an Lybrand to study the feasibility of setting up a production plant of sodium cyanide in PNG. The pre-feasibility report has been submitted in July 1989. The report gives tacit support to a follow up on the project and a full fledged feasibility study to be conducted.

The home market for PNG is estimated at 7,000 to 10,000 t p.a. The Australian market - Australia is the world's largest importer of sodium cyanide - is estimated at 87,000 t p.a. in 1990. There were plans to build a 15,000 t p.a plant Kwinana and two more projects in WA and Central Queensland were under study. Nothing is known about the outcome. But even after setting up the production facilities in Australia, the country will stay the major net importer of this product, being a potential market for a plant in PNG.

The minimum capacity of a cyanide plant is stated to be 10,000 t p.a., employing one reactor. According to the report, the economies of scale require at least a second reactor, making the search for export markets imperative.
On the technology side, the report acknowledges that the most advanced process available is with the American firm Du Pont and the German firm Degussa. These two companies are not willing to allow their process to be used under license by outsiders and the second best technology will have to be adopted. Some consideration should be given to the idea of winning over either company as a know-how and joint-venture partner. The German firm Degussa is already shareholder in the OK Tedi mine.

The basic technical requirements for the sodium cyanide production are stated in the report as:

- adjacent to a source of gas in the highlands, supplying both feedstock and the fuel for power generation,

- adjacent to a mini-refinery, supplying assiciated gas and by-product hydrocarbons for feedstock and fuel for power power generation,
- adjacent to a source of gas on or near the Papuan coast, supplying both feedstock and fuel for power generation, or

- adjacent to the cheapest possible source of hydro-power, with either an indigenous or an imported hydrocarbon feedstock.

The economic feasibility study will determine the best site for the plant. Prior to commissioning a study, some thought ought to be given to the search of a technical partner and to the risk potential of a sophisticated chemical industry. The uncertainties pertaining to the marketing of the surplus production which cannot be sold to PNG mines is evident. There is a substantial environmental risk to be taken into account and offset against the favourable financial

benefits which have been presented in the report - given the hypotheses are realistic.

Quoted from the report:

- Recognizing the extreme toxicity of HCN gas, the reactor unit is designed specifically to minimize the total contained gas volume and the fluid bed reactor itself, the absorber and the interconnecting piping. Stringent safety features are incorporated in all aspects of design, construction, maintenance, and both normal, and abnormal operations.

Accident risks cannot be ruled out. They have occurred in the chemical industry all over the world and only the catastrophic ones have widely been publicised. It seems to be a very difficult decision to promote this industry in the wider context of the industrial experience and available trained manpower in PNG.

2. Construction of refineries

According to the "Inception Report, Domestic Use of Hydrocarbons" (Department of Minerals and Energy, Report prepared jointly by Coopers &Leybrand, Waigani, PNG and Blumer Associates Pty Ltd, Sydney, Australia), newly constructed oil refineries have normally a minimum capacity of at least 100,000 barrels a day or about 5 million t. p.a. This capacity is suitable for countries with a high consumption of petroleum products, but plants with lower capacities to suit the needs for smaller sized countries are also available and the possibiliy to install a refining plant for only 25,000 barrels per day is presently under review.

The construction of a mini refinery is recommended to be built in the Southern Highlands to exploit the newly discovered oil fields. The refinery finds its justification in the high transport cost for coastal fuels and the fuel consumption of the mines. The capacity will be only 2000 barrels per day of refined products, and the

refinery will also perform the crude oil stabilization function if located closely to the oil field. Provisions will be made to extract Liquid Petroleum Gas (LPG) which is widely used in private households and could effectively replace the wood as cooking fuel.

To join the production of sodium cyanide is also mentioned as one option but later on cast in doubt by adverse factors, influencing the economies of this project. The production of LPG appears to be competitive only in the highlands and not in the coastal area or the islands of PNG, due to elevated transport cost.

The crude oil reserves of PNG to date are estimated at 170 million barrels and the daily production planned from 1992 on will be 47,000 barrels for that year and from 1993 to 2002, 103,000 barrels respectively.

Taking the minimum economic capacity for refineries into account, the consumption of petrol products in PNG (see Table 20, annex) does not suggest the installation of large scale refining capacities to substitute all petrol products, but further investigations into the installation of a smaller capacity coastal bound plant may prove its viability.

However these considerations may be overruled by other developments of higher petrol consumption and other industries becoming feasible in the context of the changing economic pattern of PNG.

3. Natural gas and its derivatives

The discovery of natural gas fields in PNG raises the question of their utilization in the industrialization process. The use of natural gas as a source of energy is the first step. The gas fields of Hides feed an electric power station which supplies the Porgera mine. The installed capacity of the power station is around 60 MW.

More ambitious plans go in the direction of a gas liquification plant. The liquification of natural gas (LNG) requires investments over the billion Dollars mark and can only be promoted in co-operation with multinational companies. The technical possibility of a liquification plant is real and depends on further explorations and the discovery of coastal gas fields. The economic indicators, e.g. world market prices, freight cost to the major consumers and investment cost will determine the final outcome. It is still too early to count on this industry in the foreseeable future.

The development of a chemical industry, based on the derivatives of natural gas is in PNG's interest, but the situation is the same as for LNG.

The production of methanol and its derivatives ethylene glycol, formaldehyde and resins are technically possible. The same is valid for amonia and its derivatives amonium nitrate and urea.

However the internal consumption of PNG alone does not justify the setting up of this industry and all will depend on the prospects of exportation. The domestic imports of all types of fertilizers for example is approximately 30,000 t p.a., ruling out any economy size plant based on inland consumption.

The above mentioned Coopers & Lybrand report supports the view that the production of Methanol and its derivatives for the local and export market may have a chance in PNG, but further studies are said to be necessary. The processing margins on these products are relatively low and the capital investment per person employed is very high.

The capital investment surpasses PNG's resources. Whenever PNG wants to take a major share in these industries it has to consider the opportunity cost of missed investments in other sectors of the economy with greater social benefits.

4. Manufacturing of explosives

ICI Dulux Papua New Guinea PtY Ltd proposed the establishment of explosive factories near the mining sites in PNG in order to reduce the transport and storage risk.
Amonium nitrate, stabilizers and activisers will be imported and transported as components to the mine sites, where they will be processed.

The total consumption of explosives is estimated at 20,000 t p.a.

F. Engineering industries

Engineering industries in PNG employed around 4,171 persons in 1988 (17.2% of the work force employed in the manufacturing industries sector) and contributed 1.4% to the National Income at market prices (see Table 21 and 22, annexe). The low rate of the contribution to the National income is an indication of the still low degree of industrialisation of the economy. Engineering industries have normally a value added of over 40%. Their prospects of interlinking with other industries make them the focus of industrial development. Despite the good prospects and the attention they receive within the framework of development, these industries have a hard time to develop in a liberal and open economy. Competitive imports and the lack of skilled manpower often slow down the process of development.

The size of the market is often a restraining factor for foreign investment seeking the economies of scale which are often only achievable with larger production capacities.

However, engineering industries have the advantage to be able to offer products and services which are closely adapted to any specific condition of a market.

Thereby it is not always recommendable to give preference to the establishment of new industries. Existing industries may be more apt to take up new production lines and are often far more resistant to market and technical risks than newly started ventures. The market experience, established management structures and not to underestimate, the know how to overcome problems with financing institutions and the public service give established industries a competitive advantage.

Various studies have been prepared for the implantation of engineering industries, primarily directed towards import substitution. But despite the promotional efforts undertaken, the response was disappointing. It must be admitted that the major part of these industries have been conceived as part of industrial zones and integrated service centres in the urban areas of Lae and Port Moresby. The first industrial zone, which will open is being established in Lae and the response to this concept, new to PNG, will also indicate the validity of some of the proposed ventures. Most of the studies have been done on the request of the PNG Government, by the Industrial Development Unit of the Commonwealth Fund for Technical Co-operation (CFTC).

1. Forged hand tools and others

Both studies have been presented by CFTC in October 1981. The forecast profitability statements shows losses during the first 5 years with no prospects of improvement.

According to the presentations, these industries are not viable under the present conditions of very inexpensive imports. Even heavy government intervention in their favour leave them no chance to break even.

2. Pillar taps, cocks and valves

The project, presented by CFTC aims at substituting imports for the above mentioned items. The imported raw material requirements are brass ingots and extruded metal bars which have to be machined directly. Only 14% of the sales revenue is imported, the value added of this industry in full operation is expected to be 60% of sales. The capital requirement, fixed capital and working capital in 1981 prices has been quoted at around K402,000,-- This industry may be started even on a smaller scale with a reduced overall investment.

3. Builders hardware

The proposal has also been presented CFTC in October 1981. The conclusion is that this project is not feasible. The losses, hypothetically generated are substantial and suggest that even a protected market would not turn this venture into a viable one. The abundant supply of very cheap imports leave only little chance to the manufacturing of mass produced items of this kind.

4. Electric fans

The study (CFTC, October 1981) makes an inquiry into the assembling of electric fans from imported components and arrives at a negative result due to the small market for these gadgets. It may be the wrong approach to limit the study to a single, relatively inexpensive gadget. The assembling of kitchen stoves, refrigerators, freezers and air-conditioners has been done in other developing countries with similar limited markets. Also the assembling of TV sets is feasible, if a certain differential in import duties for assembled and disassembled gadgets is allowed.

5. Domestic steel and aluminium utensils

The manufacturing of domestic steel and aluminium utensils is one of the first import substituting industries implanted in developing

countries. CFTC's study, October 1981, suggests a nearly complete line of utensils to be manufactured in PNG. Despite an existing plant in Lae, there seems to be enough scope to promote a second plant - or an extension of the existing facilities. The investment at 1981 prices is stated at K 1.4 million with working capital requirements of about K100,000.-

Net profits are expected from the second year of exploitation on. Despite the optimistic outlook of the study, the production of this product line should be done in phases and preferably be undertaken by the existent manufacturers. The competition from imports require protective measures for these products.

6. Buses and semi trailers

The manufacturing of buses and semi trailers is done in developing countries with equally small markets and transport requirements akin to PNG. The local construction of semi trailers and buses on imported chassis is often successful. Bus manufacturers don't adapt their products to road conditions prevailing in most developing countries. Custom tailored, locally built buses can be heavier, simpler equipped (wooden benches, ample luggage room for agricultural products and animals) and less vulnerable to gravel roads. Due to lower labour and capital cost, the product can be cheaper and the useful live of a bus much longer. Especially in West Africa, workshops exist with the manufacturing capacity of two to five buses per month. Locally built semi trailers should be able to compete with imported ones. The manufacturing of heavy tanks, house watertanks, boilers etc. falls in the same production line of heavy duty metal products. Joint venture partners can be eventually found. The Auwaerter K.G. in Stuttgard/FRG, manufacturer of Neoplan buses gained experience in this field and operates a plant in Ghana. This company can be invited to explore the market in PNG and the Pacific region with the view to enter into a joint-venture partnership.

G. Miscellaneous industries

1. Corrugated boxes, plastic trays and cups.

A study abut the above mentioned product line has been done by CFTC and delivered in September 1989. The study comes to the conclusion that both products can be produced economically for the internal market. Savings can be seen in the importation of bulk kraft paper reels instead of batches of cartons. The close relation to the consumer, allows the supplier to adapt the production easier to changes in the demand pattern. Lower wages allow the choice of plants with a more labour intensive technology and a higher flexibility. One supplier exists already in Lae but he has a comparative disadvantage to serve the Port Moresby Market. The plant is therefore recommended to be located in Port Moresby. The production is expected to reach more than 2.5 million cartons in the first year and achieve a sales close to K1 million. Net profits are expected from the first year on. Unfortunately the study gives no indication of the situation in the existing factory and the impact, the new factory might have on the existing firm. This question must be answered prior to commissioning another factory.

The prospects for the manufacture of thermoformed plastic products is good, given the acceptance of this material by the population. The product range comprises trays, lunch boxes, cups and other containers. The market is seen for fast food outlets, packing of meat, marine food products and eggs. The fixed capital investment is modest with around K150,000 and K20,000 working capital requirements. Two units, one for Lae and one for Port Moresby, can be set up.

2. Safety shoes

Pacific Merchants PTY. LTD. Lae, commissioned a study on the manufacture of safety shoes, which has been presented in January 1980 by the German firm Docke & Co., Bremen/FRG.

Following the study there is a good market in PNG for safety shoes. Though no statistics were available, it is estimated that 130,000 pairs of shoes are used annually. An export potential to Australia exists. The main consumer sectors indicated are, mining, construction, civil engineering and agriculture. Little chance is given to the manufacture of plastic sandals and thongs.
A shoe manufacturing unit may be conceived in the context of the setting up of a tannery. The Canadian based firm BATA SHOES is one of the most third world experienced manufacturers of footwear with production plants in many developing countries. A multi national company has the chance of exchanging moulds and machines within its own enterprise and overcome the problems of smaller inland markets. For a company like BATA the competitive manufacturing of a whole range of footwear is more likely to be successful than for an individually operating firm. In addition, exports within the network of multinational companies are more likely to be achieved. BATA should be contacted with the aim to arouse the company's interest in PNG.

3. Dry cell batteries

Two studies have been made for the implantation of dry cell manufacturing facilities in PNG. The first study by CFTC from May 1991 suggests two manufacturing plants in Port Moresby and Lae, each firm producing only one battery type, i.e. the size UM1 and UM2 respectively. The second study, undertaken by Touche Ross in October 1982 makes provision for one factory (location is not specified) and the production of UM1 from imported raw materials, UM 2 and UM 3 from semi finished products. UM1 and UM 2 are the most common battery sizes. Both studies forecast a satisfactory profitability but request far reaching protective measures.

The manufacturing of dry cell batteries needs the 100 % importation of all raw materials, machines and for a certain period the services of technicians and management personnel. There is no comparative advantage and this industry will have will face difficulties to

compete with cheaper imports from mass producing manufacturing plants. The competition from long-life batteries, which will still be imported, if not banned or disadvantaged by extremely high import duties, has not been assessed.

4. GLS lamps

The manufacture of GLS lamps was studied (CFTC, October 1981) but found not feasible due to the high import content of components and the relatively small market which allows not to operate an automated plant.

5. Confectionary industry

There is no feasibility study available but the success of this type of industry in similar structured countries suggests its viability. The production of sweets is possible on an artisanal scale but there should be a market, large enough to allow the inception of a small sized industrial plant. The only problem to be attended to, is the sugar price, which is considerably higher in PNG than the world market price. Protective tariffs will have to be applied in order to give the local product a fair chance to compete.

VI. THE INDUSTRIAL POLICY

The 1990 Draft White Paper on Industrial Development states in its instruction to macro-economic Policies: "Macro-economic policies will aim at creating and maintaining an economic growth as well as stabilising the domestic economy throughout the international commodity cycle".

To create the economic environment conductive to a balanced development depends largely on the state of the economy and foremost on the place it takes in the context of world markets.
PNG is an open economy and highly integrated in the world trade. With its agricultural commodity exports it is a price taker. PNG is not in the position to influence world market prices with anyone of its commodities. PNG's standing in the mining sector is becoming more important though it is still a long way off to reach a quasi monopolistic position.

Exports consist of raw materials. Some basic processing is done in the country, e.g. coffee deparching and oil extraction.
The raw material export renders PNG vulnerable to price fluctuations in world markets and the downward trends of prices for agricultural produce over the last decade have adversely affected the economy.

The manufacturing sector was left behind in the overall development and could not compensate the income loss from falling agricultural raw material prices. Its performance has been regarded as disappointing.

In the search for appropriate strategies to improve the difficult state of the economy and in the hope of reversing adverse price trends, the manufacturing sector is seen as the dynamic force to bring the economy back on the path of growth.

It is generally assumed that the manufacturing sector can be strengthened by directing special efforts towards the further processing of resource products and the substitution of imports.

Import substitution and the exportation of further processed raw materials must be seen in the context of existing trade relations.

Downstream processing of agricultural produce is a logical consequence in many cases, but not in all, and it is dangerous to generalise.

Price fluctuations of processed goods follow normally the prices of their raw materials.

Processing in large plants, close to a consumer market, is often more economical, than processing the produce in the growing area.

This is due to the lack of a technical infrastructure, harvesting cycles, varying capacity utilization, higher factory and administrative overheads and other possible constraints in the produce growing country.

Idle capacities of food processing plants in industrialised countries may in certain cases keep prices for the processing of agricultural produce down and a newly established plant may face difficulties to compete, even if it is strategically better located.

The high degree of monopolization of the processing industry in the major consuming countries leaves newcomers little chances to penetrate the already occupied markets.

Countries with a sizable inland market can evade this situation if they allow themselves to take certain products out of the world market context and treat them strictly on set terms in a protected environment.

It is very difficult to judge whether these countries gain from their policy or lose in the end.

PNG follows a liberal trade policy, it has very favourable foreign exchange regulations with practically no restrictions, its currency is freely convertible.

If this policy is maintained - and there is good reason to do so - PNG's government is restricted to create the overall protective environment necessary for an aggressive policy towards the manufacturing sector while obeying by the principles of a liberal commercial policy at the same time.

The same is valid for import substitution. Certain problems are even more pronounced in this particular case.

In a world market where protectionism is prevailing and free trade the exception, comparable advantages are not the only force directing the allocation of resources.

South East Asian Countries have built up economy scale plants in the manufacturing sector under the protective shield of their inland markets and a low cost labour force - often referred to as social dumping.

Any small country without a natural protection through high transport cost can only try to promote its own industry by an extreme tariff structure or strict import bans.

This policy however is only applicable for the inland market. There is little hope to reach the stage of a profitable exportation for part of the production at a later stage.

It may therefore be wiser to discard projects which envisage the importation of the larger part of raw and semi-processed materials.

To enter the race for the establishment of manufacturing industries through high protection and incentive schemes may turn out to be a costly and often futile exercise with the respective government and country at the losing end.

The employment created in an industry with doubtful viability should be related to the income foregone by the protective measures and the opportunities to create employment in other sectors.

The public sector offers many opportunities to create employment in the social service sector or by improving infrastructure facilities. Related to PNG, the focus of economic development may well be the primary sector.

The mining sector will remain the most dynamic force behind PNG's economic development.

The funds earned and made available from mining should be allocated to the most promising investment in terms of social economic benefits. These investment opportunities appear to be in the remaining resource sectors of PNG, in agriculture, forestry and fishing. The manufacturing sector will continue to exploit the opportunities offered by the primary sector. The development of industries in newly opened mining areas serving as an example.

The expanding agricultural sector will provoke downstream processing facilities of its products whenever this is seen to be profitable by the private investor.

The country cannot afford to venture into non-viable manufacturing industries. Only the strengthening of the primary sector lays the foundation for a sound industrial base at a later stage.

VII. TRADE AGREEMENTS

PNG is signatory to the Lome Convention, to the Papua New Guinea Australia Trade and Commercial Relations Agreement (PATCRA) and to the South Pacific Regional Trade and Economic Co-operation Agreement (SPARTECA).

Though the Lome Convention allows duty free access of primary products and manufactured goods to the markets of the EEC on a non reciprocal basis it does not offer particular advantages to PNG but places the country in the same competitive position with the rest of the sixty eight APC states.

SPARTECA is a regional agreement of the Forum Island Countries (FIC) with Australia and New Zealand. PNG is the most important trading partner of the FIC, followed by Fiji. Under this agreement, PNG has free access to the New Zealand market for all his present merchandise exports.

PATCRA is a bilateral treaty between Australia and PNG. PATCRA is a reciprocal bilateral free trade agreement, whereas SPARTECA is non-reciprocal. Quota entitlements under PATCRA are allocated to PNG while global quotas of SPARTECA must be shared among member countries.

Both trade agreements apply the principles of the rule of origin. 50% of the export content must originate from either FIC sources and/or Australia and New Zealand.

The negative list, i.e. the list of products not falling under the agreements has been revised on several occasions and contains now textiles, clothing and footwear, sugar, steel and passenger motor vehicles.

PATCRA can be a facility to penetrate the Australian market with PNG based industries.

Article 3 of the agreement stipulates the the creation of a free trade area between Papua New Guinea and Australia. But provisions have been made to forestall the danger of harming Australian industries by increased outside competition. PNG has not a large scale industry now to be a threat to Australian markets under this agreement. Potential investors may have second thoughts about conquering the Australian market with PNG based industries.

After specifying the preferential and normal conditions in Article 5, exceptions are introduced in Article 8, of which sub section (n) provides a general waiver in case of balance of payments problems: "necessary to safeguard its external financial position and balance of payments". Australian's balance of payments position would have been always good for this argument in the past.

Article 11 (Suspension of Obligations: Deflection of Trade) emphasises the danger of lower import duties of raw materials from third countries accepted under the rule of origin and eventual dumping practices by third suppliers.

Article 12 is a general waiver: "Member States may agree to the suspension of any obligation under this agreement on the ground that there exist exceptional or emergency circumstances creating severe difficulties for one or both Member States".

Article 13 makes direct allegations to dumping in which case article 3 of the treaty will be suspended.
Similar Clauses are applied in the SPARTECA agreement which makes it compatible with PATCRA.

The advantages of the trade agreements depend to a large extend on the protectionist policy by Australia and New Zealand towards the rest of the world. The wider these countries are opening their markets to the rest of the world, the higher is the degree of competition for PNG.

Australia seems to have gained more from the arrangements than PNG. The balance of payment is by far in favour of Australia while the exports from PNG have not reached a significant level. Japan and Germany were the leading trading partners for PNG's Exports (see Table 10) while Australia occupies the 4th place with only 6.6% in 1988. From 1986 to 1988 the Australian imports from PNG were in effect declining while the overall export volume to the rest of the world increased. The same is observed for New Zealand. Australian and New Zealand's markets are relatively small and have grown slowly in the past. It is therefore difficult to increase exports decisively to these countries and PNG will have to look for markets in its traditional export countries in the EEC and Japan. East European countries may become interesting markets in future and deserve close observation.

VIII. INDUSTRIALIZATION INCENTIVES.

The government has introduced a large variety of incentives to bring about the desired overall economic development and stimulate the manufacturing sector in particular. Government incentives alone are rarely decisive factors for investors though they may be important incitements in certain circumstances.

The first precondition for a private investor is the availability of a profit potential. This profit potential must exist independently from government concessions.

Resources and markets are the basic determinants for entrepreneurial activities. The market size is of highest priority. Resource based industries are normally export-oriented while non resource based manufacturing industries depend on a reservoir of skilled labour and a sufficiently large inland market.

The first precondition created by a government is not the preconceived advantage by an incentive scheme, but the creation of an overall atmosphere conductive to the generation of business.

Observing the basic principles of public administration like,

- protection of the individual, his personal freedom and property in retaining law and order,
- the consistency of the law and the fiscal obligations,
- the efficiency of the administration,
- political stability,

goes a long way towards the creation of a favourable climate for private investment.
The better the overall economic climate and the atmosphere of doing business unhampered by restrictions and constraints, the less needs to be done to improve the conditions for a potential investor. This is particularly important for foreign investments.

Pertaining to manufacturing industries some more specific preconditions are vital to attract firms to settle down in the country. However it is equally important to pay attention to the industries already operating in the country. To prevent established industries from closing down and assist them to overcome existing difficulties is often the best incentive for new industries to set up business.

The overall conditions expected by private investors may be summarized as followed:

- A stable macro-economic climate.
- Transport infrastructure (roads, bridges)
- Utility infrastructure (electricity, water, sewage)
- Social infrastructure (housing, medical facilities, schools)

The availability of an infrastructure is needed for all industrial activities, but manufacturing industries are normally not of the economic size to be in a position to built up the necessary infrastructure facilities themselves. The quality of the infrastructure determines the cost structure of the industry and thereby its ability to compete successfully. If these facilities are underdeveloped, other incentives will hardly make up for them.

In contrast to manufacturing industries, mines find their environment rarely in a region with a developed infrastructure. Mines must develop their infrastructure in any case and the international competition for the exploitation of mineral deposits is determined to a large extent by nature and not by man. Manufacturing industries operate in a man made environment and it is this setting which has the greatest impact on the decision making process to start an industry in a certain place.

Incentives have their role to play but they must be harmonized with the government's requirements to raise funds which are also needed to keep the infrastructure in a satisfactory state and improve it.

PNG's entrepreneurs see still room for ameliorations of the basic public administrative and industrial infrastructure, which in their eyes is a major constraint to industrialisation. The shortcomings mostly named were:

- Problems with the land tenure system, non-availability of land.
- Effective control of law and order.
- Delays in the administration.
- Unfair competition from imports due to slack import controls.
- High price for electricity.
- Electric power failures and fluctuations.
- Scarcity of housing.
- Bad roads.

High real wages in PNG were among the most frequent complaints from entrepreneurs. The high level of real wages in PNG must be regarded as part of the economic and social environment which should not be changed in the short run. A reduction in the real income to employee households would lower the purchasing power and thus the sales of local manufacturing industries as well. It is more in the interest of the country to raise the productivity and bring it in line with the existing real wages then trying to lower them and risk a falling demand and social unrest.

A number of incentives have been recently initiated and some also abolished due to disappointing performances. All existing schemes are presently under review.

The still existing incentives can be classified under:

- Subsidies and grants
- Government guarantees
- Government participation
- Preferential government purchasing
- Fiscal incentives
- Other Incentives

A. Subsidies and grants

The Feasibility Studies Incentive Scheme supports the establishment of feasibility studies in contributing 50% of the cost and a maximum of K100,000.- To date this facility has rarely been used.

In view of the assistance given by UN organisations and bilateral assistance which can be requested for feasibility studies, this measure cannot be regarded as attractive and may be open to abuse. Foreign companies will hardly make their decisions to invest dependent on a participation in their project study cost. They may rather regard it as a convenient cost saving measure.

The Less Developed Areas Project Scheme, applied to businesses in rural locations of 41 districts, provides up to K100,000.- grant funds or up to 40% of project costs (whichever is lower) when the client contributes 10% equity funds and is able to secure a bank loan for the balance.

This scheme can lead to the establishment of new ventures but the low personal commitment of only 10% equity requires elaborate follow-up procedures and extension services in the manufacturing sector, where problems are most likely to occur. Promoters with low commitments have the tendency of abandoning their enterprises when the first difficulties arrive.

The commodity stabilisation fund is a precondition not only for the availability of exportable agricultural produce but also for further processing industries which rely on the steady supply.

Wage Subsidies for Manufacturers of new products may be granted for up to 5 years on a falling percentage schedule. The subsidy is granted for the employment of automatic citizens and is based on the relevant statutory minimum wage. It starts with a subsidy of 40% which is annually reduced to 10% in the 5th year.

This wage subsidy may favour more labour intensive technologies and help to overcome difficulties in the initial production phase where productivity is lower. It is not known whether this scheme has prevented the introduction of labour saving technologies. Entrepreneurs may be tempted to rationalize in order to bring the overall productivity better in line with the wages. If the wage subsidy can tip the balance in favour of more labour employed, it is worthwhile to be extended to other industries than the one prescribed now.

B. Government guarantees

The Credit Guarantee Scheme has been conceived to help small businesses with a national ownership of at least 74%, obtain commercial bank loans. For the non-agricultural sector, the government guarantees 80% of a medium term (5 years) loan of up to K100,000 .-

This facility can be of substantial importance to smaller manufacturing enterprises who have to built up their credit rating in order to gain access to regular commercial bank financing.

Investment guarantee treaties have been concluded on a bilateral basis with several countries. These treaties are vital for the promotion of foreign investment in PNG. They guarantee protection from nationalisation, expropriation and make provision for the repatriation of capital and the remittance of loan funds.

C. Government participation

Government's participation in investments is limited to mining and larger agricultural projects, apart from public utilities.

The arguments against government participation in private ventures focuses on the question how efficient civil servants are in taking over entrepreneurial functions. It is commonly agreed that the public

sector should be kept out of private investment in a market economy. Private ventures needing government's participation to be set up, have to be particularly scrutinized and their costs and benefits established.

D. Preferential government purchasing

Government contracts make provisions for the preferential treatment of local manufacturers. To put local manufacturers on the same footing as importers, imported goods which are duty exempt are calculated up to 20% higher when compared to locally manufactured items. Companies fully or partially owned by automatic citizens are entitled to an extra penalty on competing imports of up to 10%.

Preferential treatment of local businesses will help to widen the scope of local companies and improve their capability to tender for government contracts.

E. Fiscal incentives

1. Export incentives for manufacturers

Exporters of manufactured goods (43 goods are listed as qualified) are exempt from income tax for the first 4 years of exportation. For the following 3 years all profits accruing from exports exceeding the average export sales of the previous 3 years are also exempt.

There is some doubt whether this incentive will have a distinct impact on manufacturers. It it may only be used conveniently whenever the opportunity arises. Profits to be made by manufacturing and exporting certain goods depend on cost and market conditions and not on the income tax rates. Every entrepreneur will first assess his profitability and later think how he can best avoid taxes.

2. Rural development incentive

New businesses (manufacturing, restaurants and hotels, construction, real estate and business services) in 41 designated districts enjoy a 10 years tax holiday.

The same argument as above arises, whether the designated entrepreneur will be attracted by a tax holiday if he cannot be sure to make a taxable profit at all. It may however be an incentive to shift companies from other areas to one of the 41 designated districts. 10 years appear to be extremely long for a tax holiday and undue advantage may be given to enterprises which gain from an unforeseen development in a particular area, e.g. the installation of a mine.

3. Double deductions

Double deductions from the taxable income are allowed for certain export market development costs incurred for locally manufactured products and for the training cost of local employees.
In the case of local employee's training, double deduction is allowed on the salaries of personnel under training up to 75% of the actual cost.
Double deduction of export promotional expenses will have no bearing on the export performance of a company and can be regarded as a fringe benefit allowed for by the fiscal authorities or bare window-dressing.
Double deduction for training purposes is useful in view of the training requirements of employees and given the reluctance of employers to spent money on staff training.

4. Depreciation incentives

The flexible depreciation for manufacturers allows an initial depreciation up to 100% of any plant, newly introduced in PNG and

having a life span, exceeding 5 years. Buildings to house the plant and storage facilities for raw materials fall in the same category.

This facility is worthwhile in view of the deferred payments of taxes in the start up phase of a project, where the liquidity position of a company is strained.

5 Customs duty and excise tax reductions

Indirect taxes are cost factors and meant to be calculated in the price of a product in order to be passed on to the consumer. However, the price is determined by market forces. In case the supplier is in a position of a price taker, the tax cannot be passed on or calculated, but must be borne by the supplier. All exporters are price takers and it is the obligation of the government not to impair the export chances of a product by imposing a levy on it.

On the contrary, some export items are often deliberately taxed to keep the inland price below the export price and encourage further processing. Or it is simply the intention to skim off part of the profits deriving from the exportation of a particular product. The first case is typical for agricultural products, the latter for minerals.

Manufacturing industries in Developing countries are regarded as too fragile to be exploited for fiscal purposes.

To give preference to local manufacturing industries, the government intends to lower or abolish the import duty on raw materials, used in the production process. At the same time it will protect export industries by retaining or increasing the duty on competing imported finished products. The loss of government revenue is meant to be compensated by levying excise taxes on the locally manufactured products.

All exports of locally manufactured goods will be exempt from excise taxes.

From the theoretical point of view, the price neutrality of the fiscal interventions is safeguarded for exportable products, but the implementation procedures must follow the same line.

If the indirect taxes are prepaid on the manufacturing level and exported products have the right of a drawback claim, the time elapsing between payment and drawback becomes very important for the exporter. If the waiting time is unduly long (businessmen complained about bureaucratic delays), the prepayments are an undue strain on the company's liquidity position and wipe out the advantages which were initially intended to strengthen the position of the exporting company.

The revision of the tax system ought to go hand in hand with procedures which are consistent and transparent to the tax payer and do not impair the principle of fiscal neutrality for the target group.

F. Other incentives

1. Import quotas and bans

The imposition of quotas and bans are often used to protect local industries from outside competition. These instruments should be used only as a last resort. In many cases they turn out to be counter-productive to the protection of local firms. Experience has shown that highly protected manufacturers are not maturing to be fully competitive in a free market.

The temptation exists to lift the import ban temporarily when the local industry does not live up to the expectations. In this case importers make windfall profits and hurt the local company to a point where it may consider to close down its production.

2. Industrial estates

The first Industrial Estate is presently under construction in Lae. Industrial Estates are seen as breeding grounds for small industries. Experience made with industrial estates in other developing countries is mixed. Some industrial estates had to be highly subsidised and extensive concessions were granted to persuade entrepreneurs to occupy these premises.

The situation in PNG will be different. There is an acute shortage of industrial land with a complete infrastructure.

It is not done with the opening of an industrial estate alone, supplementary investments into the social infrastructure like housing, schools and health services within the neighbourhood, will be necessary in the near future.

The Malahang Industrial Estate in Lae has the best economic preconditions for success in PNG due to its strategic location and the overall industrial development of Lae.

Valuable experience can be gained from its inception and operation. The development should be closely monitored before other Industrial Estates are planned.

IX. PROMOTIONAL ACTIVITIES

The overall pattern of incentives and promotional efforts in PNG to foster joint ventures and the development of manufacturing industries compares favourably with other countries but the result has been disappointing. The often cited horses were lead to the well, but they refused to drink. Were the waters troubled? Were the right horses lead to the well? What went wrong? The assessment is not easy and there is probably no direct answer, at best an opinion. The above named constraints have repeatedly been blamed for the poor response of investors.

But there is the mining sector, which is not deterred to operate and prospect further despite the present Bougainville crisis.

Of course there is a distinct difference between mining and manufacturing. PNG has favourable geological conditions which override all other constraints.

Manufacturers have a wider choice to set up their businesses and the attraction for an investor increases with the size of his market and the closeness to the resource base.

The dynamism of the mining industry attracts service and manufacturing industries which give support to mines. But mine-supporting manufacturing industries are in danger to close down as soon as the construction phase of a mine has ended. This development is cyclical and does not contribute to a sustained economic growth. Experience in other parts of the world has shown that mining towns have not developed their own growth potential if there are no other growth generating factors, e.g. other industrial ventures in the region.

If PNG wants to attract new manufacturing ventures it can best do it in the resource sectors.

Apart from mining as the presently most dynamic resource sector, the agricultural sector, forestry, fishing and tourism need attention. It is therefore imperative for PNG to concentrate its promotional efforts on these resource based sectors.

To broaden the agricultural base is the precondition for downstream processing industries. It is not always feasible to cut the exports of raw materials in a short time in favour of further processing industries without impairing existing contractual obligations, but the cultivated area can be extended in the medium and longer term. Palm oil processing can be promoted in co-operation with international partners or on a smaller scale by private PNG firms to

satisfy the local market. In the first case, a multinational company already established in food processing would be a desirable partner, in the second case a local party with an interest in larger oil palm plantations could take on this project. The technology to operate smaller plants on an economic scale is available.

Six coconut based projects have been listed (see Project List in annex). The quantity of coconuts available may attract an international firm to install processing facilities in PNG. There is also room for smaller plants to specialise in derivative products for the local and export market.

Coffee offers not too many prospects for further processing. It should be kept in mind that the deparching of coffee is already an industrial process performed in the country. Roasting and vacuum packing will remain a niche in a specialty market but is not likely to gain importance on a larger scale for various technical and marketing reasons. The installation of an instant coffee plant cannot be rejected outright but the co-operation with know-how and marketing partners is essential.

Fruit processing should be promoted in view of the inland market, beginning with the provision of a continuous supply of fresh fruits in urban markets. The development of plantations to manufacture fruit juices, marmalades and jams may be started on a smaller and diversified scale. The proposals presented in the respective studies indicate that the processing cost are out of proportion with the purchase price for fruits at the plant's site. This problem may be overcome in smaller, less capital intensive units with lower overhead cost.

Pyrethrum, a substitute for chemical insecticides in certain areas, has an excellent chance to become a good export crop in the long run and further processing gives PNG a natural advantage in the world market. This crop has yet to be exploited to its full, potential.

Vegetables cannot yet be seen as an export crop but there is some potential for the inland market and its pre-preparation for urban supermarkets. In the long run however unutilized land may well lead to higher production and finally also the exportation of vegetables. One could imagine that the growing health consciousness leading to an increasing demand for organically grown agricultural produce (like the PNG's organically grown coffee) offers new ways to market vegetables grown by smallholders at slightly higher prices than the mass produced large-farm vegetables.

Minor export crops are spices and ginger which offer a potential for further processing on a reduced scale.

The main problem of promoting downstream processing projects in agriculture is the involvement of smallholders. Whenever smallholder cultivation is considered as a major input, emphasis has to be laid on the efficiency of agricultural extension services. The promotional activity in agriculture starts on the village level and the quality of the extension service determines the availability and the handling of the crop. Without a major investment into these services, downstream processing has no material base. No production plant can afford to adapt to fluctuating supplies of raw materials caused by unreliable provisions. The natural harvesting cycle puts already a strain on the installed capacities.

Small scale tanneries are feasible but the availability of hides and skins depends on collection centres and slaughterhouses. The proper skinning, necessary to obtain quality hides for tanning, is a precondition for the success of this industry.

Forestry is a major resource base in PNG. It must be borne in mind that primary forests, if not carefully managed, are non-renewable resources. The World Bank has identified three major projects but tentatively made its recommendation subject to reforestation programmes on a larger scale. The promotion of forest products, and particularly finished wood products, offers a variety of

possibilities. Manufacturing facilities are already existing but need to be further developed to attain the maturity to exploit export markets.

Fishing is a resource based industry which requires promotion on two fronts.
As an industry to improve the nutritional basis of the population, the installation of a distribution infrastructure to local markets and a local fishing fleet is desirable.

The exploitation and on shore processing of the tuna reserves for export purposes by joint ventures with foreign companies appears to be possible if PNG's fishing policy reserves the right of fishing only to locally registered companies which obey the rules set by PNG's authorities. To gain access to PNG's vast and rich fishing grounds, foreign companies need in this case not to be attracted by promotional measures, except those concessions which are commonly granted in other countries, such as the duty free supply of fuels and the duty free importation of the fishing vessels and gear.

A. Official promotion

The inception of a new institution under the name of Investment Promotion Agency (IPA) is planned for early 19991. The regulations are awaiting finalization and to discuss the outcome would be a matter of speculation. However some guiding principles of safeguarding the promotional character of this institution may be discussed.

The authority will incorporate the Company Registrar's Office and exert some control over the setting up of new businesses.

The governing principle will be the promotion of new investments with the controlling function to be kept to an unavoidable minimum.

The first task is the dissemination of information to potentially interested parties and the establishment of wider international contacts, e.g. through trade commissions, the participation on international trade fares, direct approaches to trade associations and private firms.
The evaluation procedures leading to investment approvals and the eventual benefit of incentive measures should be clear and transparent in order to avoid the allegation of discrimination.

When time-limits are applied to avoid undue delays for applicants, an integrated approach for all necessary certificates should be taken. The responsibility of obtaining licences within a given time limit should be assumed by IPA.

Foreign and national ownership of enterprises is often subject to regulations.

In cases investment is being sought in a sector where the capital layout surpasses the locally available financial means, the search for local participation should not be made obligatory. Whenever several companies are competing to implement a project, it is not any longer a matter of promotion and it is only legitimate to obtain the best deal for the country - including a local participation. But these cases will be confined to the petroleum and mineral sector and be decided on the bargaining table outside IPA.

If a time limit of licensing is applied for business ventures, the life-span must take the likely economic life of a corporation into account. To limit a business venture through licensing bears the danger of the entrepreneur seeking maximization of the short term profits without investing in the future of his business.

Agricultural exploitations need extremely long gestation periods if one disregards cash crops.

Forestry is a particular case. If the government imposes the obligation of reforestation, the exploitation of forest reserves becomes a continuous affair over generations in anyone area. Limitations would only lead to uncontrollable exploitation with the danger of environmental damages being caused.
Private sector interests need to have a strong representation in IPA's Board of Directors.

It is well understood that the government has to safeguard the interest of the nation and cannot allow private interests to dominate its decisions. But investment promotion should take precedence over stringent regulations and administrative considerations, whenever possible.

B. Promotion through bi- and multilateral agencies

The Lome Convention has defined the task of the Centre for the Development of Industries (CDI) in the Article 89 and 90 as an institution created to "strengthen industrial enterprises in the APC States, notably by encouraging joint initiatives by economic operators of the Community and the APC States".
Assistance is proposed in the fields of:
- Project identification,
- Project- rehabilitation and establishment of enterprises,
- Identification of Joint-Venture Partners,
- Assistance in the Mobilisation of Finance and
- Technology Transfer.

This will be facilitated by:

- Preparation of feasibility and marketing studies,
- promoting the marketing of APC manufacturers on their domestic markets, the markets of other APC States and within the Community,
- conferences and meetings of businessmen, bankers and policy to exchange views and experiences.

- identify training opportunities and assist in the implementation of appropriate schemes.
- dissemination of information pertaining to the industrial potential of ACP States and industrialisation trends in the Community
- promotion of subcontracting, expansion and consolidation of regional industrial projects.

It appears that PNG has not yet made full use of the offered assistance and there appears some scope to tap these resources. Private investors have to be informed about the help they can expect in the search for overseas partners and the promotion of their exports. The newly founded Investment Promotion Authority will have to play a key role as a liaison office.

In co-operation with several host countries, UNIDO has established Investment Promotion Services (IPS) e.g. in the towns of Tokyo, Cologne, Milan, which provide information and assistance to private investors seeking joint ventures or other forms of industrial co-operation with firms based in these countries. To assist small and medium-scale industries, UNIDO has launched a project development facility at the IPS Cologne to assist entrepreneurs and their potential joint venture partners by financing part of the expenses for feasibility studies and joint venture agreements.

The Commonwealth Fund for Technical Co-operation, based in London has assisted PNG with a variety of feasibility studies and may be approached to assist in the active promotion and identification of potential joint venture partners within its sphere of influence.

C. Private promotion

Promoting private investment is often a personalized affair and private industrial promotion can be a valuable supplement to official promotional measures. Many projects rely on the more intimate information exchanged among private businesses.

In order to explore this avenue on an international scale, the German government has commissioned experts to be assigned to chambers of commerce or other private associations with the task of facilitating private contacts among firms to promote:

- joint ventures,
- exports and
- the transfer of technologies.

The experts belong normally to either a consulting firm with a base in Germany or the German Finance Company for Investment in Developing countries. The German based company employs in addition a counterpart stationed in Germany who has the task of providing the desired information and on request promoting all proposed ventures. This exchange of information is meant to bring potential partners together and help to make business relations more transparent. This service is provided under the German Technical Assistance Programme. The service is free of charge for the receiving country and does not affect the foreign assistance quota of the respective country. Since the Federal Republic is PNG's second largest export market, it may be logic to make use of this service. The Japanese Government should also be approached for this service in view of the importance of Japan as first export market. The ties with Australia and New Zealand are already close and the recession limits the scope for large improvements in the export potential to these countries at least in the short run.

X. CONCLUSIONS AND RECOMMENDATIONS

The list of identified projects is by no means comprehensive (see List , annex) and the indicated projects may be appended by linking undertakings. The majority of viable projects stresses the importance of the resource based sector.

Out of 25 agriculture based projects, 16 are considered to be achievable in the near future.

The forestry sector is promising. Apart from the three named major projects which have been recommended for further studies by the World Bank, a variety of small and medium sized wood based industrial plants for the manufacturing of finished products or components for the export market are within the reach of PNG.

The Fishery sector depends largely on government's licensing policy of Far Distant Fishing Vessels within its territorial waters and the support it is willing to extend to local fisheries to build up a network of supply within PNG.
The prospects in the construction materials industry are varied. The resource base is a precondition for the success of this industry. However, the outlook for large scale resource based industries like cement plants appears bleak in the long run because of the competition from countries with a large economy-scale cement industry such as Korea, Thaiwan and Thailand.
PNG's internal consumption has not yet reached the level of 200,000 t p.a., regarded as the minimum capacity for an economy sized larger plant. The installation of smaller plants with an alternative technology aimed at satisfying the market in the highlands may be justifiable by the high transport cost for cement from the coast to the centres of consumption.

Presuming the availability of clay deposits, the manufacturing of bricks is sensible and there are prospects for several brick plants of different dimensions near urban centres.

The chemical industry is represented in Lae and Port Moresby with smaller units like the ICI PNG paint and industrial gases factory, K.K. Kingston with bleaching agents, the Colgate soap factory and Belltek, producing detergents, disinfectant, polishing and cleaning products. Longer term aspirations are the creation of a large, export oriented petrochemical industry. The setting up of a mini refinery for the highlands which produces also household gas is foreseen in the near future.

These investments represent a high capital outlay and have far reaching consequences for the PNG economy whereby the employment effect remains negligible.

Non resource based industries are the most sensitive ventures with lower probabilities of realisation. None of the twelve listed projects appears to be fully convincing and their realisation will require high degrees of market protection. Only six projects may have a reasonable chance at all.

Promoting industrial projects is a longer term affair and does not alleviate the unemployment situation in the short run. Resource based manufacturing industries have a fair chance of success but their realisation faces also delays while the labour force intending to enter the formal employment sector is growing. The multiplier effect created in the manufacturing sector is modest, linkages are not established immediately but built up over longer periods of time. Private industries are hesitant to invest on a larger scale if they find the business environment difficult. PNG is caught in a vicious circle of lacking the resources needed to create the suitable economic and infrastructure environment which is expected by investors but which can only be financed through sustained economic growth.

To overcome these problems, PNG may best give priority to the protection and cautious exploitation of its natural resources and improve the necessary infrastructure in order to form the base for a future industrialisation.

To foster large manufacturing plants which cannot survive without major government intervention is not an appropriate approach at this stage of development.

To ensure the broad participation in the economic development, the informal sector must be the main beneficiary. This can be achieved by the improvement of the rural infrastructure and efforts to

encourage industrial activities on the village level. If the migration from rural into urban areas can be stopped or at least slowed down, much has been done for the control of law and order and the unemployment situation in the cities.

The industrial base for the future is best created by a healthy agricultural sector with the potential of supplying enough food for the population at any time. Downstream processing of local produce for the home market should have first priority and if found to be competitive in export markets, private investment will not hesitate to come in on reasonable terms and without excessive incentives.

To encourage private investment in the manufacturing sector, the fiscal policy and the tax regulations ought to be consistent and predetermined. Frequent changes must be avoid in order to allow the private sector to plan for longer periods in a secure economic environment. Income tax incentives are less attractive to the potential investor than incentives reducing the burden of indirect taxation. Incentive schemes should not only concentrate on new investment projects but be balanced to keep existing industries alive and discourage the reformation of such industries for the sole purpose of reaping benefits of a pioneer status.

Subsidies, grants and easy access to loan financing can only be recommended if thorough evaluations are done prior to the project's implementation and the later follow up can be assured during the loan amortization period.

The promotion of investments will be put in the hands of the newly founded Investment Promotion Agency (IPA). To perform its duty, this agency will have to assume the function of a liaison office between the public service, bi- and multilateral aid agencies and the private sector. If IPA will be guided by the principles and considerations of the private sector and the economic necessities of industries, the institution has every chance to succeed. If IPA sees the responsibility preferably in an investment controlling function

it may suffer the fate of the National Investment Agency (NIDA) it has come to replace.

Apart from the official investment promotion, public relations and related activities by private associations should be encouraged. Australia and New Zealand are regarded as quasi home markets by PNG through the Trade Agreements. Both markets have not yet proved to be of major importance and PNG's promotional activities will have to be more diversified and also directed towards Japan and the European Community.

Over the initiative to establish new relations, old affiliations cannot be put at risk and the existing industries cannot be left out when new measures to favour new investments are considered. The existing business community has proved to be a reliable partner over the years and deserves to be treated on equal terms with newcomers who will have still to substantiate their worth.

XI. ACTION PLAN

Project promotion is a continuous process which may be demonstrated in a corollary of succeeding procedures. The time required for each phase is different for every individual project and difficult to assess in advance. Any figures suggested are gross estimates.

The procedures however follow the same idea in any individual case and can be regarded as applicable for all individual projects.

After establishing priorities the list of projects, the task of promoting the indicated projects should be delegated to working groups. Within the working group, which may come under the responsibility of IPA or the Ministry of Trade and Industry, the individual tasks are delegated to persons assuming the responsibility for one or more projects at the same time. It is advisable to give the responsibility for several projects to one

person, because there will be ample slack time between enquiries and incoming information.

The promotion of a project will be broken down in five distinct phases. Each phase is a logical step in the direction of answering open questions prior to the realisation of the project under review. The collection of project information is an intelligence-like task which should be performed within the public administration and with a minimum of outside help. The establishment of a feasibility study will have to be considered at a later stage. It is important that the intelligence work, i.e. the gathering of basic information is done well in advance. The terms of reference for a feasibility study will in this case be drawn up with far more precision and knowledge.

1st Phase

The first phase consists of the project identification. A project profile has to be established, which indicates the technical implications. In many cases more than only one project profile will be required. Projects can be conceived on a large, medium or small scale. It is often useful to establish profiles for every possibility and decide later on which size should be preferred in the context of the actual economic setting.

The specific questions to be clarified (for details see check-list Phase 1, annex) are the following:

1. Raw materials/resources studies
2. Determination of the product line to be manufactured
3. Determination of inputs, raw materials, utilities, equipment, capital.
4. Technological process to be employed.
5. Labour and management requirement.
6. Land availability and transport accessibility to markets.
7. Logistic requirements and infrastructure.
8. Market informations.

9. Preliminary project related cost/benefit studies.

The product and the product line is part of the identification of the project. It may be modified or expanded in the evaluation process. Tentative estimates of the planned output will have to be made.
The raw material base will be established on the basis of statistics and related information from other ministries and their departments, e.g. Ministry of Agriculture, Department of Minerals and Energy, Fisheries and others.

The technology employed is determined by the estimated output. Information can be obtained either from existing local firms or on request from foreign machine suppliers, Buyers Guides with the corresponding addresses of the major firms are available at all foreign embassies.

Labour and management requirements can be estimated on the information about the employed technologies.

The availability of land has to be indicated and verified with the Lands Department.

On the basis of the foreseen location, transport and communications can be assessed. The availability of access roads, telephone, electricity, water and sewage disposal has to be indicated.

Market information for imported products can be given by the import statistics, for exportable items, world trade statistics (if available) have to be consulted.

2nd Phase

The establishment of a project profile is followed by the search for a suitable promoter. The responsibility of the identification of a promoter may be assigned to a different person or working group. A decision will have to be taken to search for a promoter within PNG,

outside of PNG or both. If the project is of a smaller or medium size and likely to attract local investors, promoters can be identified within the business community with the help of local business associations or chambers of commerce. If the project is likely to surpass the financial means of local investors, the search should be extended to foreign countries. If the likely export market is identified, it is sensible to contact entrepreneurs in the respective country. Business associations, chambers of commerce and major trading houses will be the target group. The Centre fort the Development of Industries (CDI) and the Investment Promotion Service of UNDP may also be approached for assistance in Brussels or the UNDP may be also approach for assistance.

After the project profile has been established, the search for a suitable promoter has to be launched. It has to be decided in which bracket the project falls and which promoters are likely to be attracted. Small scale industries will concentrate to search in the local business community for interested parties while larger projects may be passed on to foreign investors. If foreign investors are seen as the target group, countries which may offer the best prospects will have to be selected. Within these countries, business associations, chambers of commerce or larger firms and business houses may be contacted directly and if interest is shown, the project profile together with public relations material about the government's investment policy and general information about PNG and should be submitted.

Contact addresses can be provided by business directories, trade missions and through foreign embassies.

3rd Phase

The successful identification of promoters is followed by a screening process, where intelligence information has to be gathered about the promoter himself. If an interested promoter is

not known by his world-wide operations, the submission of financial statements for the last three years is the minimum requirement. If negotiations become more serious, a bank reference may be sought. The qualification of the technical and financial ability must be established beyond doubt.

The negotiations with potential and reputable promoters have to be conducted on a higher level, e.g. the Secretary of the Ministry of Trade and Industry and in case of an important investment decision to be taken, on the ministerial level as well.

4th Phase

In the advanced stage, where the potential promoter is identified, a feasibility study may be desired by all parties or only to obtain the necessary bank loans. The terms of reference will have to be drawn up in close co-operation with all parties involved in the project preparation. The promoter is of primary importance within this framework and the use of the feasibility study for a later stage of project implementation is far more likely.

The project preparation has already widened the knowledge about the potential project and the terms of reference can be specified to best suit the purpose. The quality of a feasibility study depends to a large extent on its preparation and the bulk of information which can be provided prior to its execution. The cost of a feasibility study can also be lowered considerably by the reduction of work for the appointed consultant.

5th Phase

In this phase the company will be established as a legal entity and seek the registration. The company may at the same time apply for the incentives provided. The pre-investment phase ends and the investment starts with the invitation of tenders.

The tentative time requirement for the 5 phases are estimated as follows:

1st Phase: 1 to 3 month
2nd Phase: 3 to 5 months
3rd Phase: 1 to 2 months
4th Phase: 3 to 5 months
5th Phase: 2 to 3 months

Total time for the promotion of a larger size project may be 10 to 18 months.
The tentative time table, which is only a rough estimate, indicates the relatively long lead-time of a project preparation.

As immediate action to be taken, the following steps are proposed:

1. Dissemination of this report to embassies and high commissions in Port Moresby.

2. Dissemination of this report to agencies such as CDI, CDC, Friedrich Ebert Stiftung, Delegation of the European Community and UNIDO.

3. Dissemination of this report to the private sector and agencies such as Chambers of Commerce, the Australian/PNG Business Co-operation Committee, etc.

4. Dissemination of this report also to Trade Commissioners, other Departments and to SBDC.

5. Strengthening of DTI and appointing one senior DTI officer and one senior NIDA officer to follow up on recommendations in this report.

6. UNIDO staff to follow up the suggested projects and establish detailed project profiles in together with other DTI staff members.

7. Arrange a seminar sponsored by DTI and NIDA to follow up on the promotion of projects.

8. Demand through the German Embassy the services of an adviser on the promotion of Joint Ventures, Exports and the Transfer of Technology under the German Technical Assistance Programme. The Adviser should be attached to the most active chamber of commerce in PNG.

PROJECT LIST

ISC*)	SECTOR / PRODUCT LINE	SPECIFICATION	RANKING	IMPLANTATION	REMARKS
3115	PALM OIL PROCESSING	MARGERINE PRODUCTION OTHER PRODUCTS	2	TO BE DECIDED	Possible if multinational partner could be identified
3115	PALM OIL REFINING	PALM OIL REFINING	1	RABAUL	To be decided whether on a larger scale for export or smaller scale for local market
3115	COCONUT PROCESSING	REFINED COCONUT OIL	1	RABAUL	Local investor to be identified preferably in cooperation with larger plantation
3121	COCONUT PROCESSING	DESICCATED COCONUT	1	TO BE DECIDED	Possible at various levels for home market and exportation
3121	COCONUT PROCESSING	COCONUT CREAM	1	TO BE DECIDED	For home and export market
121U	COCONUT PROCESSING	CHARCOAL FROM COCONUT SHELLS	1	TO BE DECIDED	Demand from Mining companies, gold leaching, and also for household demand
3121	COCONUT PROCESSING	PASTEURIZED AND DEHYDRATED COCONUT MILK	1	TO BE DECIDED	Mainly for export markets, needs competent marketing partner
3121	COFFEE PROCESSING	ROASTED AND VACCUUM PACKED COFFEE	1	GOROKA	Extension of existing plants or new plants for export in specialty markets especially as organically grown coffee
3121	COFFEE PROCESSING	INSTAND COFFEE	3	TO BE DECIDED	Possible in cooperation with multinational firm or foreign partner in an export market or for inland consumption if small capacity plant is feasible
3119	COCOA PROCESSING	SUBGRADE PROCESSING PLANT	2	TO BE DECIDED	Subgrade processing plant (cocoa nibs) is eventually possible, awaiting establishment of feasibility, i.e. availability of sufficient subgrade cocoa
3559	RUBBER PROCESSING	SHEET RUBBER OR FINISHED PRODUCTS	2	TO BE DECIDED	Pending identification of suitable products and sufficient raw material availability
3113	FRUIT PROCESSING	FRUIT JUICE	2	TO BE DECIDED	Pending on plantations and availability of fruits at competitive prices
3113	FRUIT PROCESSING	PINEAPPLE CANNING	3	PORT MORESBY	Not likely to be viable due to international competition, for inland market only
3113	FRUIT PROCESSING	PRODUCTION OF MARMELADE AND JAM	1	POM/LAE	For inland market, can be done on a small scale, protection necessary due to high sugar prices
1120	VEGETATABLE PROCESSING	PREPREPARED VEGETABLES	1	Highlands	Preparation and portioning of vegetables for supermarkets for urban centres
3121	VEGETATABLE PROCESSING	POTATO CHIPS	3	WABAG	Small scale recommended, larger plant faces marketing problems

3512	PYRETHRUM PROCESSING	CONCENTRATE	1	MT. HAGEN OR SIRUNKI	Modernisation of existing factory or new factory to be built in Sirunki, pending the increase of the pyrethrum harvest in Enga
3512	PYRETHRUM PROCESSING	PRODUCTION OF MOSQUITO COILS	1	MT. HAGEN OR SIRUNKI	Depending on the availability of Pyrethrum, for home and export markets
3121	SPICES	PRODUCTION OF SPICES AND GINGER PROCESSING	1	HIGHLANDS	Precondition is growing of spices & ginger for industrial processing, small size plant to start industry is desirable
3111	CHICKEN PROCESSING	SLAUGHTERING AND PACKING	3	HIGHLANDS	Only possible together with large poultry farm, little chance due to feed transport cost
3111	CHICKEN FARM - LAYERS	EGG PRODUCTION	1	HIGHLANDS	To satisfy the growing market in Porgera
3122	ANIMAL FEED	FEED MILL	1	PORT MORESBY	Utilising mostly local available palm oil cake, maize, oil cake and mill run
3231	HIDES AND SKIN PROCESSING	TANNERY	1	LAE AND BULOLO	Production of blue wet for Lae, hair on tannery in Bulolo for local consumption
3231	REPTILE TANNERY	TANNERY	1	PORT MOREBY OR LAE	Processing of reptile skins in a medium sized specialised plant for exportation
3114	SNAIL PROCESSING	SNAILMEAT FOR EXPORT TO FRANCE	1	RABAUL	promoter identified, pending on the outcome of trials
3121	HONEY PROCESSING	HONEY PRODUCTION	1	GOROKA	Extension of bee-keeping and exploration of overseas markets for surplus
3311	FORESTRY	INTEGRATED SAWMILL/ MANUFACTURING BOARD	1	NOT DECIDED	Project proposed by the World Bank, based on large scale reforestation
3311	FORESTRY	CHIPPING OPERATION	1	NOT DECIDED	Project proposed by the World Bank, based on large scale reforestation
3411	FORESTRY	PULP MILL	1	NOT DECIDED	Project proposed by the World Bank, based on large scale reforestation
3320	FORESTRY	RATTAN PLANTATION AND PROCESSING	1	EAST SEPIK-WEST NEW BRITAIN	Under the conditions of large scale cultivation, furniture industry possible for the exportation of rattan furniture
3114	FISHERY	TUNA FISHING AND PROCESSING	1	RABAUL	Establishment of fishing fleet and on-shore facilities incl. cannery, cooperation with foreign partners wanted
3114	FISHERY	FROZEN FISH FOR LOCAL MARKETS	1	LAE	To create on shore facilities to cater for the local markets, local fishing fleet, refrigeration chain to serve local urban markets
3692	CONSTRUCTION MATERIALS	CEMENT PLANT, CAPACITY 200,000 t	0	NOT DECIDED	Uneconomical due to high capacity and stiff world market competition
3692	CONSTRUCTION MATERIALS	CLINKER MILL, CAPACITY	0	LAE	Uneconomical due to high capacity and high world market competition

		200,000 T			
3692	CONSTRUCTION MATERIALS	SMALL CEMENT PLANT	2	TARI	Feasibility to be established, mainly for consumption in the highlands
3691	CONSTRUCTION MATERIALS	BRICKS AND TILES	1	CHIMBU	Feasibility to be established, depending on the availability of clay deposits
3813	CONSTRUCTION MATERIALS	STRUCTURAL COMPONENTS	2	LAE, POM	Extension of existing plants, branches in mining areas can be established
3819	CONSTRUCTION MATERIALS	SANITARY PRODUCTS	2	LAE, POM	Prod. of sanitary items in artificial marble (polyesther resin/cement)
5000	CONSTRUCTION MATERIALS	PREFABRICATED HOUSES	2	LAE	Improve existing manufacturers through cooperation and joint ventures, manufacturing of built-in kitchens, bathrooms, etc.
3511	CHEMICAL AND PETROCHEMICAL IND.	SODIUM CYANIDE MANUFACTURE	3	TO BE DECIDED	Inland consumption 7,000-10,000 t, minimum capacity estimated at 15,000 t environmental problems to be considered. Joint venture and know-how partner desirable, feasibility study to be established.
3530	CHEMICAL AND PETROCHEMICAL IND.	MINI REFINERY	2	SOUTHERN HIGHL.	Pending outcome of feasibility study, consumptin of all refinery products in the highlands.
3530	CHEMICAL AND PETROCHEMICAL IND.	LPG GAS PRODUCTION	2	SOUTHERN HIGHL.	In connection with the Mini-refinery, for gas consumption in the highlands
3511	CHEMICAL AND PETROCHEMICAL IND.	METHANOL	3	NOT DECIDED	Depending on the development of suitable gas fields and markets within PNG, world markets to be further studied
3811	ENGINEERING INDUSTRIES	HAND TOOLS	0	NOT DECIDED	Difficulties due to cheap imports
3811	ENGINEERING INDUSTRIES	BUILDERS HARDWARE	0	NOT DECIDED	Difficulties due to cheap imports
3833	ENGINEERING INDUSTRIES	ASSEMBL. EL. APPLIENCES	3	LAE/POM	Tobe studied by individual products under consideration
3819	ENGINEERING INDUSTRIES	PILLAR TAPS AND COCKS	3	POM/LAE	made of imported brass ingots, and considered viable study available. For inland market
3819	ENGINEERING INDUSTRIES	DOMESTIC STEEL AND ALUMIN. UTENSILS	2	POM/LAE	Could be a viable proposition if done by already existing industries
3843	ENGINEERING INDUSTRIES	BUSES AND TRAILERS	2	LAE	Construction of semitrailers, bus structures on imported chassis
3412	MISCELLANEOUS INDUSTRIES	KRAFT PAPER CORRUGATED BOXES	2	POM/LAE	Project feasible, production from imported rolls of kraft paper
3839	MISCELLANEOUS INDUSTRIES	MANUFACT. GLS LAMPS	0	POM/LAE	Project is considered as not viabble due to cheap imports
3513	MISCELLANEOUS INDUSTRIES	PLASTIC CUPS AND TRAYS	2	POM/LAE	Trays for fresh food and fast food packing and one-way containers, made of thermoplast

3559	MISCELLANEOUS INDUSTRIES	SAFETY SHOES, PLASTIC AND LEATHER, SANDALS	2	POM/LAE	Partner desirable, sufficient demand for safety shoes in PNG
3839	MISCELLANEOUS INDUSTRIES	DRY CELL BATTERIES	3	POM/LAE	Difficult since all materials are imported, product faces competition from cheap imports
3119	MISCELLANEOUS INDUSTRIES	CONFECTIONARY INDUST.	2	POM/LAE	If market for sweets is protected, but high sugar prices impair project

Ranking: 1 - most likely to be implemented 2 - likely to be implemented 3 - less likely to be implemented 0 - unranked, not likely to be implemented

*) International Industrial Standard Classification (ISIC)

CHECK LIST FOR PROJECT PROMOTION

1st Phase: Project Profile

- Brief description of the Project.
- Main products envisaged.
- Minor products.
- Estimated production (physical quantities) of a large scale plant.
- Alternative outputs of a medium or small scale production if also considered.
- Inputs required: Provide detailed list of all major physical inputs on the levels of production foreseen (large, medium, small)
- Give a description of the technology available for large, medium and small production, whatever is envisaged after receiving offers from suppliers of machines and equipment. Ask also for tentative layouts of machine installations in order to estimate the surface and structural properties of the buildings.
- List for the alternative(s) selected the machines and equipment and if available list also the prices quoted.
- Provide an estimate of the buildings needed for the production and storage facilities, enquire the prices per sqm. or cuft for the buildings needed. Approximate price estimates can be obtained from larger local construction firms.
- Define the land requirements by estimating the surface of buildings, the service and storage area and access roads.
- Enquire about the availability of land under consideration, it's title and the owner. Give a detailed description of the surrounding land, it's titles (customary, freehold, state land) and eventual disputes over all or part of the land in the whole area.
  All enquiries should be well documented and all deliberations in agreement with the Lands Department.
- Give a description of the available infrastructure. The availability of electricity, water, sewage. Describe the physical state of access roads (gravel-road, tar-mac, width of road) If all or part of infrastructure must be provided, describe the distance and physical properties from the next connection point (mountainous terrain, x km from main road, source of water at y km can be piped at which pressure, electricity available at which point)
- Markets will be studied in view of the sale of the production and the supply of all raw and semi-processed materials which enter the production process process.
- What is the raw material base? Transport requirements to the factory site,
- Wage scale for skilled and unskilled labour
- Availability of skilled labour

- Availability of housing for staff and workers

2. Phase: Identification of Promoter

1. Promoter is to be identified in a community?
2. Promoter is to be identified within PNG?
3. Promoter is to be identified in foreign countries?

to 1 and 2
- give a description what is expected from the promoter, reputation and standing within the community, integrity, proved to be already successful in business, can provide enough equity capital and has good chances to obtain bank financing, has sufficient technical knowledge to manage the project.
- contact the local chamber of commerce for interested promoters or parties to promote the project.
- contact business development officers in the area.

to 3

- ask foreign embassies of target countries for addresses of respective business associations and chambers of commerce.
- send request to associations together with information about theproject and general information about PNG
- send request with information about the project to CDI in Brussels and to UNDP for publication.
- advertise

3rd phase: Screening of the Promoter (for foreign promoters)

- Is the promoter a reputable person or company known world wide?
- Demand the financial statements of the company or businessmen for the last 3 years (audited accounts).
- judge the financial standing of the partner
- is the business activity abroad of the potential promoter related to the joint venture in PNG?
- Has the promoter an interest to sell any equipment?
- What are his ideas about participating?
- Of what kind consists the proposed participation? Fresh money? Equipment or a combination of both?
- Demand information through the PNG embassy in the foreign country
- Demand a bank information through a bank in PNG requesting her corresponding bank in the foreign country.
- make a judgement about the importance of the promoter in relation to the project.
- Conclude a statement about the seriousness of the promoter.

4 th Phase: The Feasibility Study

- Are the terms of reference drawn up to satisfy all involved in the
- elaboration of the project?
- Review all questions open, which could not be answered in the previous elaboration and preparation of the project.
- Check up the main concerns of the loan financing banks. Discuss the terms of reference with the financial institutions.

LIST 1

SPECIFICATION OF PRODUCTS MANUFACTURED IN PNG ACCORDING TO INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION

ISIC CODE	SPECIFICATION OF PRODUCTS
311-312 Food Manufacturing	
3111	Slaughter houses Small goods Poultry Meat Packing
3112	UHT Milk Ice cream
3115	Crude palm oil Crude coconut oil Dripping
3116	Flour Rice mill
3117	Perishable bakery products Dry bakery products (incl. snack foods) Noodles
3118	Sugar
3121	Roasted coffee Tea Honey
313 Beverage Industries	
3131	Spirits
3133	Beer
3134	Soft drinks
314 Tobacco Industries	
3140	Tobacco Cigarettes

322	Manufacture of Wearing Apparel	
3220		Wearing apparel
331	Manufacture of Wood and Cork Products	
3311		Chips Sawn timber Veneer Wooden building materials Plywood Hardboard
3319		Coffins
332	Manufacture of Furniture and Fixtures	
3320		Furniture Fixtures Foam products
341	Manufacture of Paper and Paper Products	
3412		Paperboard boxes
3419		Toilet paper Tissues Paper towels
3420		Stationery Envelopes Bookbinding Printed Products
351	Manufacture of Industrial Chemicals	
3511		Industrial gases
3512		Pesticides
352	Manufacture of Other Chemical Products	
3521		Paints
3522		Drugs and medicines

3523		Soap Detergents Bleach Glyserine Industrial cleaners
3529		Polishes Disinfectants Matches
354	Manufacture of Misc. Products of Petroleum & Coal	
3540		Oil lubricants (proposed)
355	Manufacture of Rubber Products	
3551		Retread tyres
356	Other Plastic Products	
3560		PVC pipes Plastic tableware Plastic containers Plastic bags Various other plastic products
362	Manufacture of Glass and Glass Products	
3620		Glass bottles and jars Glass cutting
3692		Lime
3699		Concrete products
371	Iron and Steel	
3710		Foundry products
372	Non-ferrous Basic Metal Industries	
3720		Refining of gold and silver
381	Manufacture of Fabricated Metal Products	
3813		Sheet metal products Structural metal products

3819		Drums Buckets Nails Wire Fencing Metal bottle caps
3829		Cookware
382	Manufacture of Machinery except Electrical	
3822		Coffee pulpers
3823		Wokabout sawmills
384	Manufacture of Transport Equipment	
3841		Ship building
3843		Trailers
3849		Wheelbarrows
390	Other Manufacturing Industries	
3901		Jewellery

– TABLE 1 –

LAND AREA, POPULATION AND DENSITY BY PROVINCE

Province	Area Sq. Kms	Population 1971 (Census)	Population 1980 (Census)	Population 1989 (Est)	Density Per Sq.Km
Western	99,300	70,339	78,337	98,600	1
Gulf	34,500	58,273	63,843	75,400	2
Central	29,500	175,515	116,361	141,200	5
National Capital	240	*	112,429	154,100	642
Milne Bay	14,000	108,528	127,725	162,100	12
Northern	22,800	65,918	77,097	97,200	4
Southern Highlands	23,800	192,047	235,390	271,900	11
Enga	12,800	131,816	164,270	185,800	15
Western Highlands	8,500	211,456	264,129	317,500	37
Chimbu	6,100	159,729	178,013	189,800	31
Eastern Highlands	11,200	236,752	274,608	321,500	29
Morobe	34,500	240,930	305,356	383,300	11
Madang	29,000	168,212	209,656	266,300	9
East Sepik	42,800	180,149	220,827	273,900	6
Sandaun (West)	36,300	93,479	113,849	135,400	4
Manus	2,100	24,356	25,859	32,100	15
New Ireland	9,600	58,507	65,657	83,300	9
East New Britain	15,500	108,238	130,730	167,000	11
West New Britain	21,000	60,783	88,415	117,900	6
North Solomons	9,300	90,382	125,506	170,300	18
PAPUA NEW Guinea	**462,840**	**2,435,409**	**2,978,057**	**3,644,600**	**8**

Source: National Statistical Office.

Note: *National Capital District was part of Central Province until 1978.

- TABLE 2 -

GROSS DOMESTIC PRODUCT BY TYPE OF EXPENDITURE

(At market prices)

	1984	1985	1986	1987	1988
			(Mill. Kina)		
Government final consumption	531.8	572.4	597.8	649.9	656.2
Private final consumption	1,445.7	1,599.9	1,670.3	1,754.3	1,846.1
Increase in stocks	71.5	33.8	-31.5	34.1	125.5
Gross fixed capital formation	547.5	446.9	539.2	575.6	633.1
Gross domestic expenditure	2,596.5	2,653.0	2,775.8	3,013.9	3,260.9
Export, less imp. of goods & services	-314.3	-250.3	-200.0	-185.7	-168.8
Gross domestic product	2,282.2	2,402.7	2,575.8	2,828.2	3 092.1

and services minus foreign income.

- TABLE 3 -

NATIONAL INCOME

(At market prices)

	1984	1985	1986	1987	1988
			(Mill. Kina)		
	881.0	944.2	1,000.2	1,071.0	1,146.1
	1,004.0	1,045.3	1,120.2	1,252.1	1,406.1
	1,885.0	**1,989.5**	**2,120.4**	**2,323.1**	**2,552.2**
from overseas	6.3	6.6	6.9	7.0	7.1
income receivable from overseas	-78.7	-95.1	-79.0	-137.5	-129.2
subsidies	179.2	189.7	212.0	240.7	258.3
	1,991.8	**2,090.7**	**2,260.3**	**2,433.3**	**2,688.4**

- TABLE 4 -

DISTRIBUTION OF GROSS DOMESTIC PRODUCT BY SECTOR

(Percentage Shares)

SECTOR	1970	1975	1980	1985	1988
Agriculture, Forestry & Fishery	40.1	29.7	33.1	33.3	30.3
Mining & Quarrying	1.0	13.4	13.2	10.0	18.2
Manufacturing	5.3	7.5	9.5	10.9	10.0
Construction	12.9	8.1	3.8	3.9	3.6
Wholesale and Retail Trade	8.5	8.5	7.9	9.9	9.0
Transport & Communication	5.7	6.9	4.6	5.0	4.9
Finance & Property	4.4	4.3	8.2	3.8	2.1
Community, Social Services & Others	22.1	21.6	19.7	23.2	21.9
TOTAL	100.0	100.0	100.0	100.0	100.0

Source: National Statistical Office.

- TABLE 5 -

PRIVATE CAPITAL EXPENDITURE BY SECTOR

(Mill. Kina)

SECTOR	1984	1985	1986	1987	1988
Agriculture,Forestry & Fishery	26.8	33.6	29.3	29.6	42.2
Mining & Quarrying	172.7	87.2	150.2	165.4	280.4
Manufacturing	29.0	23.1	22.6	24.5	28.9
Construction	16.9	19.6	14.7	16.1	38.3
Wholesale & Retail Trade	37.1	40.8	40.5	48.1	75.8
Transport & Communication	14.4	16.9	22.0	16.2	17.2
Finance & Property	22.7	31.7	18.6	28.8	27.8
Community & Social Services	10.5	6.7	6.8	4.6	6.9
TOTAL	**330.1**	**259.6**	**304.7**	**333.3**	**517.5**

Source: National Statistical Office

- TABLE 6 -

PRINCIPAL EXPORTS (QUANTITY)

	UNIT	1985	1986	1987	1988	1989 Upto July
Mineral						
Copper Conc	Tonne	559,946	589,388	650,702	760,199	411,457
Gold	Kg	24,985	28,158	16,803	13,345	2,269
Agricultural						
Coffee	Tonne	40,606	53,226	64,796	44,703	49,397
Cocoa	Tonne	31,056	30,864	34,486	37,708	27,258
Palm Oil	Tonne	123,161	128,907	97,318	102,591	81,068
Copra Oil	Tonne	38,761	41,109	40,183	36,247	19,055
Copra	Tonne	104,650	92,968	650,702	548,098	43,494
Tea	Tonne	7,025	5,322	5,620	5,838	3,180
Rubber	Tonne	5,126	4,944	3,718	4,541	2,669
Cardamon	Tonne	324	387	364	198	97
Pyrethrum	Tonne	19	15	8	3	-
Forest Products						
Timber Logs	CuM(000)	1,146	1,299	1,456	1,348	823
Timber Lumb	CuM	9,520	7,354	4,826	3,811	2,594
Woodchips	Tonne	90,715	81,037	162,522	136,558	56,462
Fish Products						
Prawns	Tonne	1,891	1,521	1,224	914	727
Fish	Tonne	8,573	136	170	57	47
Other						
Shell	Tonne	339	453	523	656	467
Crocodile Skin	Cm2(000)	719	883	901	672	304

Source: National Statistical Office

IMPORTS BY COMMODITY GROUP

(Mill. Kina, f.o.b)

Commodity G	1984	1985	1986	1987	1988 Upto Aug.
Food	155	154	163	171	122
Beverage	11	10	8	12	10
Crude Materials	6	6	7	8	5
Fuel, Lubricar	156	154	93	112	70
Animal & Vegetables	4	3	3	4	2
Chemicals	62	66	81	85	57
Manufactured goods	138	132	149	182	131
Machinery & Equipment	229	248	308	322	254
Miscellaneous	84	94	90	100	70
TOTAL	**845**	**867**	**902**	**996**	**721**

Source: National Statistical Office

- TABLE 8 -

PRINCIPAL EXPORTS (VALUE)

(Mill. Kina, f.o.b)

	1985	1986	1987	1988	1989 Upto July
Mineral	**482.5**	**578.1**	**688.7**	**852.5**	**446.4**
Copper Concentrate	307.0	357.6	548.1	744.3	425.9
Gold	175.5	220.5	140.6	108.2	20.5
Agriculture	**317.3**	**323.6**	**254.6**	**236.3**	**163.4**
Coffee	117.1	203.5	134.6	113.2	88.0
Cocoa	62.8	56.2	56.4	46.0	26.7
Palm Oil	60.7	29.6	23.9	32.9	24.8
Copra Oil	22.7	10.9	14.5	17.5	8.5
Copra	33.9	10.2	15.1	15.1	9.8
Tea	13.3	7.1	5.6	6.4	3.4
Rubber	3.7	3.9	3.1	4.4	2.0
Cardamon	2.4	1.8	1.2	0.5	0.2
Pyrethrum Extration	0.7	0.5	0.2	0.1	-
Forest Production	**62.2**	**69.1**	**111.7**	**98.4**	**57.7**
Timber Logs	55.6	62.3	103.6	91.0	54.8
Timber Lumbe	1.8	1.8	1.3	1.2	0.8
Woodchips	4.7	5.0	6.8	6.2	2.1
Fish Products	**14.3**	**10.9**	**11.0**	**7.9**	**5.5**
Prawns	9.0	9.7	9.5	7.2	5.0
Fish	5.3	1.2	1.5	0.7	0.5
Other	**41.1**	**35.4**	**30.6**	**53.2**	**42.4**
Shell	0.6	0.8	1.1	1.6	1.7
Crocodile Skins	2.4	2.5	1.9	0.9	0.4
Others	11.0	14.2	10.5	16.8	10.0
Re-export	27.1	17.9	17.1	33.9	30.4
TOTAL	**917.4**	**1017.1**	**1096.5**	**1248.2**	**715.4**

Source: National Statistical Office

Note: Copper Concentrate consists of varying quantities of gold, silver and copper

NUMBER OF FACTORIES, & VALUE ADDED IN MANUFACTURING INDUSTRY (1986)

	Factories	Output	------ Value Added ------		
				Percent of:	
	Number of	Mill. Kina	Mill. Kina	Output	Total
Food, Beverages & Tobacco	153	343.3	140.7	41.0	54.6
Textile, Wearing Apparel & Leather	17	4.2	2.1	51.2	0.8
Wood and Wood Products	110	65.1	38.9	59.8	15.1
Paper and Paper Products, and Printing	26	20.9	9.8	46.2	3.8
Chemicals, Petroleum, Coal, Rubber & Plastics	21	28.1	12.9	50.2	5.0
Non-metallic Mineral Products (except petroleum and coal production	18	17.1	8.6	45.8	3.3
Basic Metal Industries, Fabricated Metal Products, Machinery and Equipment, and Other Manufacturing Industries	124	97.6	44.7	45.8	17.4
TOTAL	**469**	**576.2**	**257.6**	**44.7**	**100.0**

Source: National Statistical Office.

- TABLE 10 -

PRINCIPAL TRADING PARTNERS (IMPORTS BY PNG)

(Mill. Kina, f.o.b)

	1984	1985	1986	1987	1988 Upto Aug.
Australia	344.3	359.7	364.5	431.7	327.0
Japan	135.5	152.1	159.9	185.5	133.9
U.S.A.	75.7	73.3	85.4	80.6	63.5
Singapore	102.5	88.9	56.3	66.1	42.7
New Zealand	45.8	48.7	40.3	37.6	24.9
United Kingdo	29.6	26.2	30.7	28.3	20.4
West Germany	11.8	17.5	25.4	23.3	18.2
Hong Kong	20.1	20.3	16.6	21.7	13.7
China	17.2	15.7	16.9	19.9	13.7
Korea, Republic of	3.1	2.9	7.2	14.7	11.3
Taiwan	13.1	10.2	10.7	13.8	7.9
Belgium	4.3	5.7	8.9	11.1	3.1
Netherlands	1.7	4.1	8.6	4.2	7.5
Indonesia	0.5	0.7	1.8	4.1	2.0
Thailand	0.9	1.3	5.4	3.8	2.2
Others	38.5	39.7	63.7	49.2	29.4
TOTAL	**844.7**	**866.9**	**902.1**	**995.7**	**721.4**

Source: National Statistical Office.

- TABLE 10 - cont.

PRINCIPAL TRADING PARTNERS (IMPORTS BY PNG)

(Percentage Shares)

	1984	1985	1986	1987	1988 Upto Aug.
Australia	40.8	41.5	40.4	43.4	45.3
Japan	16.0	17.5	17.7	18.6	18.6
U.S.A.	9.0	8.5	9.5	8.1	8.8
Singapore	12.1	10.3	6.2	6.6	5.9
New Zealand	5.4	5.6	4.5	3.8	3.5
United Kingdo	3.5	3.0	3.4	2.8	2.8
West Germany	1.4	2.0	2.8	2.3	2.5
Hong Kong	2.4	2.3	1.8	2.2	1.9
China	2.0	1.8	1.9	2.0	1.9
Korea, Republic of	0.4	0.3	0.8	1.5	1.6
Taiwan	1.6	1.2	1.2	1.4	1.1
Belgium	0.5	0.7	1.0	1.1	0.4
Netherlands	0.2	0.5	0.9	0.4	1.0
Indonesia	0.1	0.1	0.2	0.4	0.3
Thailand	0.1	0.2	0.6	0.4	0.3
Others	4.6	4.6	7.1	4.9	4.1
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: National Statistical Office and Deptartment of Trade & Industry.

TABLE 11

VALUE OF PROCESSED FOOD IMPORTS, (1981 - 1987)
(f.o.b value) K'000

Stat Code	Commodity group	1981	1982	1983	1984	1985	1986	1987
012	Meat,salted,dried etc	10263	13476	11504	19771	16294	12598	1907
014	Meat,prepd or prsd; fish extracts	7563	7547	12793	8193	6283	5704	3865
022	Milk and cream	4562	4725	5384	6597	5491	5731	7255
023	Butter	1760	1636	1810	1607	1718	1393	1084
024	Cheese and curd	697	863	1041	1212	1024	905	1136
035	Fish,dried,salted,smoked etc	283	63	104	89	48	52	47
036	Crustaceans etc.,fresh,dried,etc.	212	252	275	430	394	224	265
037	Fish,crustaceans etc.,prepared	21816	19717	22073	22181	24090	33952	31879
042	Rice	23359	24836	19705	24132	28218	28658	34511
045	Cereals nes,inmilled	1781	777	1128	2065	2830	472	1760
046	Meal and flour of wheat and maslin	973	65	272	44	22	337	744
047	Meal and flour of cereals nes	190	46	132	191	127	203	1191
048	Cereals and flour preparations	6362	6677	6802	6562	7726	7485	8977
056	Vegetables,roots,tubers,prepd,prsd	1080	1408	1453	1843	1619	1494	1650
057	Fruits and nuts,fresh or dried	1503	1508	1586	1793	1704	1744	1795
058	Fruits,preserved and preparations	3681	4125	5124	4202	2895	3163	3269
061	Sugar and honey	11811	9277	1385	337	230	4108	2693
062	Sugar confectionery	1211	1179	963	931	882	882	1298
071	Coffee	2148	2042	2314	2318	2364	2284	2065
072	Cocoa	29	42	51	45	30	34	25
073	Chocolate and related preparations	704	917	883	1129	948	1119	1394
074	Tea and mate	178	223	320	474	350	304	474
081	Feeding stuff for animals	3119	4013	4471	5845	5640	6017	7334
091	Margarine and shortening	2774	3657	3610	5388	5515	5049	5394
098	Edible products and preparations nes	3985	4692	4832	7180	8152	9142	10528
	Total Processed Food Imports	112044	113763	110015	136359	124594	133104	132540
	Total PNG Imports	738135	751671	821673	944579	866894	902064	995722
	% of Food Imports	15.2	15.1	13.4	15.0	14.4	14.8	13.3

Source: National Statistical Office

TABLE 12

IMPORTS OF EDIBLE OILS, BY TYPE (1981 - 1988)
(f.o.b value)

Stat Code	Particulars	1981		1982		1983		1984		1985		1986		1987		1988(UptoJun)	
		Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000
423200	Soya Bean Oil	39.8	39.1	53.5	38.1	64.7	55.5	180.5	190.9	121.6	158.9	43.2	52.8	7.1	15.7	19.2	17.7
423300	Cotton Seed Oil	0.1	0.08	11.0	6.0	4.7	5.9	6.6	7.3	3.2	7.1	0.6	0.8	3.8	3.0	0.9	0.8
423400	Groundnut (peanut) Oil	108.8	157.5	102.6	149.6	110.3	155.7	124.0	250.8	82.9	154.1	57.3	84.4	44.7	67.6	25.7	40.1
423500	Oliver Oil	7.6	16.8	15.7	30.4	4.2	7.5	5.7	12.8	6.6	15.0	6.5	12.9	46.0	36.6	4.4	8.2
423600	Sunflower Seed Oil	64.9	74.8	69.8	76.2	62.0	79.1	78.3	119.5	62.7	92.3	82.2	107.9	93.2	102.1	60.0	71.2
423919	Rape.Colza And Mustard Oils	0.7	0.4	22.0	9.1	0.1	0.3	0.7	1.1	2.3	3.8	1.1	0.8	15.0	7.0		
423920	Sesame (Sesamum) Oil	2.8	4.9	5.7	8.4	2.2	5.6	2.5	6.6	1.0	5.6	3.0	8.7	3.8	12.3	1.8	4.4
424100	Linseed Oil,Crude,Refined or Purified	30.3	31.6	10.7	9.7	14.6	9.8	14.8	14.8	16.8	18.0	8.3	8.2	8.0	12.9	0.7	0.7
424200	Palm Oil	28.2	15.6	149.8	88.1	235.1	133.9	62.2	284.2	230	183.5	218	126.1	356	169.8	1291.0	91.5
424300	Coconut (Copra) Oil	3.1	6.7	1.5	3.6	5.6	5.5	9.2	26.7	165	5.3	40	0.9	57	4.5	300.0	1.7
424400	Palm Kernel Oil	8.0	9.5	6.7	8.4	17.3	8.1	15.4	14.1	1.9	1.0	51.8	31.6	107.4	59.5		0.3
424500	Castor Oil	0.01	0.4	2.6	13.1	0.03	0.06	0.02	0.05	0.3	0.7			0.07	0.08		
424901	Tung Oil (Wood Oil)	1.2	0.9	0.07	0.09	0.3	0.9			0.5	0.9	0.7	1.6	0.9	5.5		
424902	Teaseed Oil	0.02	0.08	0.2	0.5	0.1	0.2	0.05	0.08					0.1	0.5	0.6	0.7
424904	Maize Oil (Corn Oil)	37.3	49.4	33.1	44.6	79.2	90.8	11.0	19.4	16.6	19.4	60.3	50.9	30.9	25.4	17.7	15.6
424909	Other Fixed Vegetable Oils	415.0	386.3	447.9	420.3	872.2	820.1	1378.9	1592.5	1210.1	1309.9	1872.0	1661.5	2000.3	1687.5	798.9	755.6
431100	Animal & Vegetabla Oils,Boiled, Oxidised, Dehydrated,Etc Nes	301.3	262.7	559.2	450.3	195.1	161.9	146.9	134.9	140.8	132.9	90.4	63.3	48.1	42.8	26.4	25.3
431200	Animal,Vegetable Oils,Fats Hydrogenated,Solidified	294.7	221.4	194.5	158.4	232.7	170.1	136.4	122.3	111.2	113.1	406.3	324.6	332.7	312.8	75.3	94.8
	TOTAL OILS IMPORTS	1344	1,278	1687	1,515	1900	1,711	2173	2,798	2174	2,222	2942	2,537	3155	2,566	2622.6	1128.6

Source: National Statistical Office

TABLE 13

PAPUA NEW GUINEA - 1988

A. GENERAL INFORMATION

1.	Capital	: Port Moresby
2.	Total Area	: 46,224,300 Ha.
3.	Population	: 3.48 Million (1987)
4.	Gross Domestic Product	: K 2764 Million (1987)
5.	Currency Unit	: Kina (K)
6.	Exchange rate to 1 US$(Average)	: Kina 0.8667

B. COCONUT INDUSTRY

1.	Area Under Coconut	: 260,000 Ha. (1984)
2.	Total Coconut Production	
2.1	-In Nuts Equivalent	: 1,086 Million Nuts
2.2	-In Copra Equivalent	: 181,000 Metric Tons
3.	Estimated Domestic Consumption	
3.1	-In Nuts Equivalent	: Not Available
3.2	-In Copra Equivalent	: Not Available
4.	Exports Volume	
4.1	-Copra	: 77,263 Metric Tons
4.2	-Coconut Oil	: 36,247 Metric Tons
4.3	-Copra Meal	: 16,003 Metric Tons
4.4	-Desiccated Coconut	: None
4.5	-Shell & Shell Products	: None
4.6	-Fibre & Fibre Products	: None
4.7	-Others	: None
5.	Total Export Value	: K. 38,204,000
6.	Percentage Contribution to Export Earnings	: 3.16%

TABLE 14

Table 13. LIVESTOCK ON LARGEHOLDINGS

Livestock	At 31 December				
	1982	1983	1984	1985	1986
	number				
HORSES	1,282	1,087	1,052	1,182	1,173
DAIRY CATTLE					
Cows - In milk	363	302	318	235	234
Dry	358	294	272	222	285
Heifers - One year old and over	227	215	175	164	174
Under one year old	184	141	111	104	71
Bulls - One year old and over	39	43	45	38	29
Under one year old	59	60	8	12	8
TOTAL	1,230	1,055	927	775	781
BEEF CATTLE					
Cows and heifers - One year old and over	42,839	42,407	41,485	41,693	38,399
Under one year old	7,215	7,521	7,818	6,943	8,668
Bulls - One year old and over	2,083	1,998	2,158	1,993	2,032
Under one year old	2,299	2,339	2,613	1,804	1,420
Other	22,200	20,894	19,655	19,138	18,469
TOTAL	76,636	75,157	73,585	71,371	67,988
PIGS					
Boars	313	307	298	268	298
Breeding sows	2,418	2,445	2,003	2,382	2,253
Suckers, weaners and slips	6,952	7,481	14,923	7,373	7,559
Other	8,349	8,749	3,539	8,153	4,665
TOTAL	18,038	18,982	20,761	18,174	14,775
SHEEP	1,826	1,542	1,807	3,167	3,118
GOATS	444	430	477	227	194
POULTRY [a]					
Fowls	805,317	891,808	870,384	708,911	1,010,919
Ducks					
Turkeys	3,675	3,217	4,222	4,795	3,054
Geese					
TOTAL	808,992	895,023	874,588	711,708	1,013,973

[a] Only recorded where poultry products are marketed or flocks exceed 100 birds.

ME

TABLE 15

IMPORTS OF ANIMALS FEED,BY TYPE
(f.o.b value)

Stat Code	Particulars	1981		1982		1983		1984		1985		1986		1987		1988(UptoJun)	
		Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000
081110	Cereal straw and husks	8	1.8	41	8.2	0	0.0	0	0.1					0	0.1		
081120	Fodder roots,lupines,vetches and similar forage	45	10.8	22	3.8	28	8.1	7	2.0	9	2.5	4	3.0	3	1.4		
081190	Vegetable products (acorns,pressed fruits,pellings,pods,etc)	4	6.4	481	149.4	30	20.9	3	1.1	74	11.2	25	17.3	145	44.6	103	18.7
081210	Bran,maize or rice	527	38.1	164	58.7	5200	570.6			1933	436.4			1417	195.2		
081220	Barley,buckwheat,maize,oats,rice, rye,sorghum and wheat residue(excl: maize or rice bran)	223	34.3	640	356.7	1629	231.5	2807	323.4	2	0.5	0	0.1	0	0.1		
081230	Pollard,sharps and other by-products from the working of leguminous vegetables	8	1.1	98	25.1			145	44.2	128	37.5	18	4.6	5	5.1		
081310	Oil cake and oil residues of soyabean	2225	609.2	1091	403.1	1690	581.8	960	415.3	393	101.6	554	131.4	624	138.5	165	39.5
081330	Oil cake and oil residues of cotton seeds	675	144.1	994	205.5	348	64.4	58	17.8	173	21.2	512	53.3	330	45.5	117	18.5
081350	Oil cake and oil residues of sunflower seeds	2	2.0	5	5.4	17	5.2							0	0.2		
081380	Oil cake and oil residues of palm nuts and kernel													255	43.3		
081390	Oil cake and oil residues of other oil seeds and oleaginous fruits	2	5.8	25	24.2	5	6.1	16	7.5	0	0.2	17	6.1	4	2.5		
081410	Hay and chaff,meal of meat or offals	2709	609.3	3401	750.4	3577	851.0	4601	1234.1	3166	647.7	1974	511.8	1501	336.7	1268	320.8
081420	Meal of fish,crustaceans or molluscs	641	237.0	524	201.1	675	221.3	1179	452.7	976	345.6	785	237.8	1254	267.1	530	188.0
081920	Food wastes,cocoa shells,husks and skins					11	1.5	1	0.4								

IMPORTS OF ANIMALS FEED,BY TYPE
(f.o.b value)

Stat Code	Particulars	1981		1982		1983		1984		1985		1986		1987		1988(UptoJun)	
		Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000
081930	Food wastes,beet pulp,bagasse and other waste of sugar manufacture	9	1.7	6	2.1	52	9.3			3	1.8	429	104.4	218	35.8		
081940	Food wastes,wine lees and argol													1	6.8		
081986	Stock mashes,cubes,pellets,nuts,beef cattle	4	1.3	9	3.2	15	4.1	17	4.3	14	6.3	22	3.2	114	35.0		
081987	Stock mashes,cubes,pellets,nuts, dairy cattle	1601	4.0	15	6.8	27	6.3	2	1.1	26	4.0	24	3.4	314	26.0		
081988	Pig feed,complete,sow and weaner	56	16.5	3	1.0	59	14.2	296	73.8	324	54.4	420	71.4	299	55.1	139	44.5
081989	Pig feed,complete,creep	396	64.9	15	2.6	39	9.2	92	15.6	184	33.1	195	30.2	143	29.7	20	6.9
081991	Pig feed,complete,grower	483	114.2	69	19.9	330	121.7	1107	252.6	1855	344.5	1589	322.7	1007	221.1	845	172.9
081992	Poultry feed,complete,layer	669	314.7	183	128.8	483	172.5	1884	440.1	2704	471.5	4320	687.0	9016	1585.3	3804	745.7
081993	Poultry feed,complete,grower	703	334.7	1576	648.1	2260	739.1	3789	1065.6	12315	2354.1	13742	3074.0	23032	2947.7	8989	1938.2
081994	Horse feed,complete	108	31.2	299	75.0	251	105.9	101	26.4	122	30.7	192	39.8	287	78.6	89	17.4
081995	Dog and Cat food,in airtight containers	556	290.9	643	340.0	596	352.2	520	353.3	563	351.9	455	288.7	872	462.3	342	190.4
081996	Dog and Cat food,dry or frozen	51	20.3	89	19.6	60	30.1	49	30.8	61	40.8	80	55.9	102	57.1	33	22.4
081997	Milk powder for animals	7	6.2	7	6.4	4	6.8	3	2.5	1	0.8	2	2.6				
081998	Minerals food for livestock	151	107.9	365	273.7	143	125.8	162	106.9	121	63.0	122	55.3	536	217.3	76	41.1
081999	Feedings stuff,nes	329	109.0	679	297.6	495	206.0	146	173.8	849	278.7	1276	313.3	1876	495.5	291	150.6
	TOTAL ANIMALS FEED IMPORTS	12192	3117.3	11443	4016.4	18025	4465.6	17945	5045.4	25996	5640.0	26757	6017.3	43355	7333.5	16813	3915.8

Source: National Statistical Office

TABLE 16

APPENDIX A.5 - EXPORT OF FISHERIES COMMODITIES 1979-1987

TABLE 1: TOTAL WEIGHT (KG) OF MARINE PRODUCTS EXPORTED FROM PNG BETWEEN 1979-1987

EXPORT ITEM	1979	1980	1981	1982	1983	1984	1985	1986	1987
Prawns	993,514	798,008	887,099	322,125	1,165,450	1,100,970	1,507,872	1,467,150	1,096,713
Lobsters	7,184	102,696	163,749	162,956	63,969	41,525	50,273	62,347	51,818
Barramundi	16,690	62,450	88,810	60,400	8,500	62,602	54,743	116,480	64,372
Trochus				134,326	355,703	312,172	437,334	535,120	441,963
Blacklip				836	13,327	6,128	4,016	5,121	16,329
Greensnail				21,943	29,405	71,982	11,745	10,087	15,960
Beche de mer				9,000	7,130	4,668	16,579	119,376	121,636
Clam meat				80	9,830	949	4,202	21,030	31,657
Tuna	26,945,000	34,099,000	24,029,000	520,000	864,070	2,964,668	10,509,240		
Shark(whole)				107,595	80,000	30,000	110,000	173,000	
Sharkfin				1,000				500	
Mixed Reef Fish				68,060	10,856	100,448	38,206	71,736	16,570
Crabs				150		221			174
TOTAL	27,962,388	35,062,154	25,168,658	1,408,471	2,608,240	4,696,333	12,744,210	2,581,947	1,857,192

TABLE 2: TOTAL VALUE (KINA) OF MARINE PRODUCTS EXPORTED FROM PNG BETWEEN 1979-1987

EXPORT ITEM	1979	1980	1981	1982	1983	1984	1985	1986	1987
Prawns	3,812,902	3,764,257	5,005,034	1,666,382	8,139,647	6,457,796	9,555,818	8,894,613	8,783,661
Lobsters	59,526	819,051	1,355,189	1,580,712	887,355	519,818	578,883	870,256	763,711
Barramundi	66,433	257,900	398,120	293,740	41,500	346,375	244,717	357,895	364,514
Trochus				114,711	347,328	389,057	686,732	937,293	927,545
Blacklip				1,547	35,991	7,912	9,351	10,175	42,914
Greensnail				66,013	112,354	162,337	67,619	35,315	61,892
Beche de mer				27,586	23,939	13,472	59,022	361,336	322,536
Clam meat				71	13,294	3,407	24,684	157,652	336,262
Tuna	15,400,000	25,800,000	20,000,000	255,687	762,376	1,704,845	5,678,178		
Shark(whole)				26,899	20,000	8,700	101,750	147,450	
Sharkfin				1,500				725	
Mixed Reef Fish				23,652	22,620	144,854	71,765	89,825	53,059
Crabs					300		1,105		736
TOTAL	19,338,861	30,641,208	26,758,343	4,058,500	10,406,704	9,758,573	17,079,624	11,862,535	11,656,830

Source: DFMR

TABLE 17

Purse seine catches in the Papua New Guinea DFZ, 1982 - 1986, by country of registration (mt).

COUNTRY	1982 mt	1983 mt	1984 mt	1985 mt	1986 mt
Japan	54391	73466	54589	47974	47973
USA	-	-	14525	7947	12070
Taiwan		-	4430	6437	6863
Rep. of Korea	1119	3525	4873	2672	N/A
Mexico	-	-	1195	-	-
Philippines	-	-	1621	3388	N/A
Honduras	-	754	145	-	-
Cayman Is.	-	718	2377	5564	4291
Indonesia	-	-	-	-	19
Panama	-	468	6176	878	N/A
TOTAL	55510	78931	89931	74860	N/A

N/A - not available

Source:DFMR

Table 6 . Licence fees paid by DWFN vessels, 1980-1987 ('000 Kina)

	1980	1981	1982	1983	1984	1985	1986	1987
Japan	806	1419	2379	1960	1652	2673	1986	309
USA	-	-	448	36	625	808	464	297
Taiwan	-	-	-	37	175	292	341	578
Korea	-	-	39	163	176	292	365	731
Philippines	-	-	-	-	44	74	-	227
Honduras	-	1.5	-	-	31	-	-	-
Cayman Is.	-	-	-	-	-	146	71	36
Panama	-	-	-	-	-	193	110	-
Indonesia	-	-	-	-	-	-	101	95
TOTAL	806	1420	2866	2162[1/]	2703	4478	3438	2273

1. Includes others (unspecified) K15,000

Source: DFMR

b) Prawns

Gulf of Papua Fisheries

The industrial trawl fishery for penaeid prawns is presently restricted to the shallow waters of the Gulf of Papua, straddling the Gulf and Western Provinces. Because of prevailing weather conditions, particularly during the SE tradewind period (May - November), it is a larger vessel fishery,

TABLE 18

Average Weight of Skipjack and Yellowfin in Domestic Pole-and-Line Fishery in PNG Waters Between 1970 and 1981

Year	Skipjack kg	Yellowfin kg
1970	5.7	5.6
1971	5.5	5.4
1972	3.1	3.7
1973	3.2	4.6
1974	3.5	4.1
1975	3.4	3.2
1976	2.5	2.7
1977	2.9	3.3
1978	3.2	3.2
1979	2.9	2.8
1980	2.3	2.0
1981	2.8	2.7

Source: Department of Primary Industry, Fisheries Division

TABLE 19

IMPORTS OF CEMENT AND CEMENT PRODUCTS, BY TYPE (1981 - 1988)
(f.o.b value)

Stat Code	Stat Code	Particulars	1981		1982		1983		1984		1985		1986		1987		1988 UptoJun	
			Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000	Tonne	K'000
		CEMENT																
661201	661201	Portland Cement,Grey	49786	2100.2	51262	1963.0	48401	2030.4	46892	2214.0	40023	1992.7	40134	2089.2	1031764	1567.6	46994	1265.3
661202	661202	Portland Portland Cement,White except Ivory White	4587	172.1	8944	323.9	1091	53.4	208	9.1	134	11.1	2064	123.9	2876	178.6	363	18.1
661203	661203	Portland Cement,Other	21847	869.9	13638	549.8	15867	588.1	12145	528.0	6362	324.8	49676	1873.8	35104	2245.9	19028	929.8
661209	661209	Other Cement (except Refractory Cement)	5625	281.6	7697	316.0	14840	639.2	17231	767.0	8120	497.8	7252	543.3	3271	234.7	2588	244.3
		TOTAL CEMENT IMPORTS	81845	3423.8	81541	3152.7	80199	3311.1	76476	3518.3	54639	2826.4	99124	4630.2	1073015	4226.8	69973	2457.5
		CEMENT PRODUCTS																
661810	661810	Articles of Asphalt or of similar materials	11	7.9	25	28.9	33	39.5	5	8.9	4	3.6	4	95.8	9	26.6	20	9.9
661820	661820	Panels,Boards,Tiles and Blocks of Veg & Wood Fibre etc,Agglomerated with Cement,Plaster,etc.	92	62.2	398	167.3	75	62.1	142	81.8	44	26.3	89	88.8	67	84.9	14	21.1
661831	661831	Asbestos -Cement Corrugated Sheets	495	215.3	139	82.4	97	41.0	163	67.7	178	80.7	81	46.3	331	142.5	216	115.3
661832	661832	Asbestos -Cement Non-Corrugated Sheets Decorated	414	54.5	130	49.7	205	58.5	139	30.9	160	85.2	113	77.3	512	118.7	26	16.4
661833	661833	Asbestos -Cement Non-Corrugated Sheets Plain	2022	715.9	1766	524.0	1748	548.9	1657	665.0	1640	621.9	1541	791.2	1489	791.6	396	206.1
661834	661834	Asbestos -Cement Pipes	173	87.5	43	17.6	26	32.5	59	28.2	320	210.7	128	65.5	209	81.3	0	5.5
661835	661835	Asbestos -Cement Buildings Supplies,nes	135	102.0	66	54.4	333	192.6	107	92.0	103	51.6	170	130.2	167	129.1	130	122.1
661836	661836	Gypsum Board	85	12.5	93	19.9	266	514.7	137	32.5	142	44.8	179	49.2	196	71.1	128	27.8
661839	661839	Buildings Materials of Fibre Cement and of unfired Non-metalic Minerals, nes	239	73.3	173	92.8	331	139.9	380	197.2	259	132.9	580	348.6	510	303.2	134	77.6
		TOTAL CEMENT PRODUCTS IMPORTS	3666	1331.2	2831	1037.1	3114	1629.7	2790	1204.2	2850	1257.7	2885	1692.9	3490	1748.9	1064	601.7
TOTAL - TOTAL -		CEMENT AND CEMENT PRODUCTS IMPORTS	85511	4755.0	84372	4189.8	83313	4940.8	79266	4722.5	57489	4084.1	102009	6323.1	1076505	5975.7	70037	3059.2

Source:National Statistical Office

TABLE 20

PAPUA NEW GUINEA
IMPORTS OF FIVE MAIN PETROLEUM PRODUCTS

S. No.	Code No.	Particulars	1984 Quantity Lit.Million	1984 Value K.Million	1985 Quantity Lit.Million	1985 Value K.Million	1986 Quantity Lit.Million	1986 Value K.Million	1987 Quantity Lit.Million	1987 Value K.Million	Annual Average Comsumption Percentage Quantity Lit.Million	Quantity Barrels	Value K.Million
1.	334111	Aviation Spirit	7.765	3.043	4.441	3.579	6.283	2.125	1.124	3.415	4.903	(34239)	3.041
2.	334112	Motor Gasoline	109.396	23.463	100.164	22.735	80.407	13.052	128.597	15.348	104.641	(730733)	18.672
3.	334212	Aviation Turbine Fule (Kerosene)	28.359	6.112	27.435	5.867	26.537	4.207	51.536	6.682	3.467	(233708)	5.717
4.	334300	Diesel/Oil	219.930	42.575	237.383	45.733	233.144	31.260	314.300	38.166	251.184	(1754078)	39.434
5.	334400	Fuel/Oil	375.538	60.835	394.000	56.683	359.225	27.624	395.488	31.546	378.813	(2645342)	44.172
TOTAL			740.988	136.028	754.403	134.597	705.596	78.268	891.045	95.248	773.008	(5398100) 16358/Bareel/Day.	111.036

Table 2. NUMBER OF FACTORIES; NUMBER OF PERSONS EMPLOYED; AND SALARIES AND WAGES PAID, BY INDUSTRY, YEAR ENDED 31 DECEMBER 1988

Industry	Factories	Persons employed (a)			Salaries and wages (b)		
		Persons	Males	Females	Persons	Males	Females
	number				K'000		
ALL INDUSTRIES	682	30,633	28,387	2,246	133,042	125,695	7,347
MANUFACTURING INDUSTRIES	455	24,299	22,363	1,936	97,313	91,602	5,711
Food, beverages and tobacco	149	11,859	10,862	997	36,605	34,236	2,450
Textile, wearing apparel and leather industries	19	585	155	430	1,143	449	693
Timber and wood products, including furniture	101	5,170	5,083	87	15,604	15,282	322
Paper and paper products; printing and publishing	28	1,041	923	118	5,622	5,054	568
Chemicals and chemical, petroleum, coal, rubber and plastic products	22	850	770	80	5,499	4,975	524
Non-metallic mineral products, except products of petroleum and coal	17	623	593	30	2,858	2,665	193
Basic metal industries; fabricated metal products, machinery and equipment; other manufacturing	119	4,171	3,577	194	29,902	28,941	961
FACTORIES AND WORKSHOPS IN OTHER INDUSTRIES	227	6,334	6,024	310	35,729	34,092	1,635
Construction	53	2,097	2,041	56	10,747	10,446	301
Wholesale and retail trade, and restaurants and hotels	122	2,385	2,257	128	16,577	15,721	856
Transport, storage and communication	30	898	873	25	3,897	3,800	97
Community, social and personal services	12	200	153	47	739	581	157
All other industries (c)	10	754	700	54	3,769	3,544	224

(a) Average weekly employment over the whole year. Includes working proprietors.
(b) Excluding drawings of working proprietors.
(c) Includes four establishments in Mining and quarrying (PNGSIC code 2), two establishments in Financing, insurance, real estate and business services (PNGSIC code 8) and three establishments in Agriculture, hunting, forestry and fishing (PNGSIC code 1)

Table 3. VALUES OF OUTPUT; POWER AND MATERIALS USED; PRODUCTION; AND ASSETS, BY INDUSTRY, YEAR ENDED 31 DECEMBER 1988

Industry	Output (a)	Power, fuel and light (b)	Materials used (c)	Production (d)	Land and buildings (e)	Plant and machinery (f)
			K'000			
ALL INDUSTRIES	723,659	37,295	396,595	289,770	257,263	201,519
MANUFACTURING INDUSTRIES	621,670	29,369	347,625	244,676	207,280	163,222
Food, beverages and tobacco	383,944	14,676	227,344	141,925	114,842	106,117
Textile, wearing apparel and leather industries	6,353	128	2,900	3,325	3,504	644
Timber and wood products, including furniture	56,806	5,173	24,830	26,803	21,901	23,233
Paper and paper products; printing and publishing	26,056	730	13,294	12,032	6,498	5,687
Chemicals and chemical, petroleum, coal, rubber and plastic products	31,240	1,471	15,887	13,882	10,401	6,985
Non-metallic mineral products, except products of petroleum and coal	17,340	1,703	6,948	8,688	9,010	5,330
Basic metal industries; fabricated metal products, machinery and equipment; other manufacturing	99,931	5,489	56,421	38,021	41,123	15,226
FACTORIES AND WORKSHOPS IN OTHER INDUSTRIES	101,989	7,926	46,970	45,094	49,983	38,297
Construction	32,724	1,739	17,822	13,163	5,729	11,693
Wholesale and retail trade, and restaurants and hotels	42,768	2,595	21,687	18,486	32,607	5,040
Transport, storage and communication	7,472	1,091	3,963	2,418	3,624	3,133
Community, social and personal services	2,436	180	736	1,520	1,718	1,264
All other industries (g)	16,589	2,321	4,762	9,507	6,305	17,167

(a) Value of goods produced and industrial services provided.
(b) Includes lubricating oil and water.
(c) Includes repairs and replacements and cost of containers.
(d) Value added to materials by the operations of a factory as defined on page 2. It is derived as the value of output less materials, power, fuel and light used.
(e) Value at end of year, including estimated values of rented premises.
(f) Value at end of year, including estimated values of leased machinery.
(g) Includes four establishments in Mining and quarrying (PNGSIC code 2), two establishments in Financing, insurance, real estate and business services (PNGSIC code 8) and three establishments in Agriculture, hunting, forestry and fishing (PNGSIC code 1).

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