OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org
<table>
<thead>
<tr>
<th>1.0</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.25</td>
<td>1.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>
Introduction
The objectives of the study are to assess, on the basis of overall prospects for industrial development for the coming 10-15 years, the long-term prospects for development of industry producing plant equipment. The study will include a review of the role of processing equipment industry within the overall framework for industrial development. On the basis of demand projections, the study will identify the priorities for development of this industry; assess the existing production capability and examine the requirements and scope for progressive domestic manufacture of selected groups of plant equipment. The relevant strategic options and policy measures needed to stimulate production will briefly be examined. The study is to provide a basis for subsequent detailed techno-economic studies.

Chapter I. Assessment of Overall Prospects for Industrial Development

1.1. brief survey of recent economic developments in Indonesia which will influence the medium- and long-term prospects for industrial growth and development. Particular emphasis to be placed on the trend in oil prices, the recent devaluation of the Rupiah, performance of agricultural sector and external sector, and outlook for long-term growth and development of the overall economy.

1.2. Short review of recent growth and structural change of the manufacturing sector and its role within the overall economy in terms of RWA,
investment, employment, number and size of enterprises, ownership pattern and location; performance and efficiency of the manufacturing sector; inter and intra-sectoral linkages; composition and geographical pattern of external trade of manufactured products; and major constraints on further development of the manufacturing sector.

1.3. Analysis of long-term prospects for industrial growth and development; long-term structural changes in industry and outline of priority issues for industrial strategies (forecast of GDP and MVA to be consistent/co-ordinated with those made in Chapter III).

Chapter II. Survey of Current role, Size and Structure of Plant Machinery and Equipment Industry

2.1. General characteristics and definition. A distinction is made between:

i) plant equipment industry consisting of machinery and equipment for enhancing the production capacity of the industrial sector. The term is used synonymously with producer goods or capital goods for the industrial sector.

ii) capital goods industry consisting of machinery and equipment for all sectors of the economy including transport equipment but excluding consumer durables.

iii) engineering goods industry consisting of fabricated metal products, mechanical goods and scientific equipment including consumer goods.

In analyzing the prospects for development of the plant equipment industry the interrelationship and substitution of production capacity among these industry groups should be kept in mind. While the study will mainly focus on plant equipment for the industrial sector, it will also examine plant equipment for energy sector, oil refinery and mining.
2.1. Assessment of current role and structure of plant equipment industries within the manufacturing sector in terms of value, output, employment, labour productivity and intensity, investment, fixed capital formation, production capacity and utilization and comparison with capital and engineering goods industries. Inter-country comparison with other developing countries with large domestic markets.

2.2. Review of composition of domestic production and imports of various types of plant equipment and capital goods products, and analyses of the stage of "progressive manufacture" (manufacture versus assembly operation).

2.3. Analyses of the existing enterprises in terms of size, number, location and company structures according to public sector, joint ventures, local non-pribumi and pribumi enterprises.

Chapter III. Demand Analyses for Major Categories of Capital Goods and Plant Equipment

Detailed forecast of demand for capital goods and plant processing equipment by 70 product groups for 1985, 1990 and 2000 under alternative forecast of GDP and sectoral shares (NVA). The demand estimates will be based upon the econometric forecasting model developed by Econometric Research Ltd., which has been applied in other oil producing developing countries. The forecast will be based upon import trends and domestic production of major categories of capital goods and plant equipment; investment in machinery and equipment in key manufacturing sectors; estimates of targets specified in the Development Plan; and estimates of replacement demand. Three alternatives forecasts, based upon alternative assumptions (high, medium, low) about future oil revenues will be generated. The demand assessment will include inter-country comparative analysis with other developing countries having large domestic markets. (The forecast of GDP and NVA in this chapter should be consistent or estimated with those used in Chapter II.)
4.1. Realization of priority sectors, production targets and planned investment of the Fourth Five-year Plan 1961/65-1969/70 and development criteria for plant equipment industries currently thereof.

4.2. Comparative analysis of priorities for development of capital goods and plant equipment adapted by other developing countries with large domestic markets, viz. Brazil, Mexico, India and the Republic of Korea. Identifications of options available for Indonesia and inferred priority and thrust for the development of plant equipment industry vis-a-vis long-term prospect for industrial growth.

4.3. Broad assessment of potential comparative advantages of Indonesia for the production of various groups of plant equipment products. A critical analysis of the comparative advantages due to low labour costs and appropriate design and the element of low productivity and "design lag" respectively that affect the advantages.

4.4. Broad preliminary assessment of potential national economic benefits and costs associated with progressive domestic production of plant equipment in terms of net balance of payment effects, contribution to GDP and MVA, backward and forward linkages, capital intensity, etc.

4.5. Brief assessment of viability of progressive domestic production of selected groups of plant equipment industry by comparison of minimum economic scale of production with demand forecast.

4.6. Based upon the various criteria from the above analyses the priorities of the sub-sectors for the manufacture of plant equipment are assessed. The relative priorities could be assessed by attributing weightage factors to the matrix of criteria.
6.7. The annual projections are then superimposed by the priorities identified in 4.6. and the various groups of plant equipment products which may lend themselves to progressive domestic production will be identified. The product groups would be based upon the following classification:

a) General machinery tools
b) Other machinery and equipment common to all industry
c) Special purpose machinery and equipment for industries that include:
   i) Iron and steel
   ii) Fertilizers
   iii) Pulp and paper
   iv) Cement
   v) Sugar
   vi) Food processing
   vii) Wood industries
   viii) Textiles
   ix) Spare parts for plant equipment industry
d) Equipment for energy sector, oil refinery and mining

4.8. Assessment of scope for development of (domestic) regional metal working enterprises/centres.

4.9. Preliminary assessment of scope for production and export within the framework of ASEAN regional co-operation in industry.
Chapter 5: Evaluation of Existing Technical Capability and Requirements for Progressive Domestic Manufacture of Plant Machinery and Equipment Products

5.1. Evaluation of existing capabilities. Having identified the priority groups of plant equipment products for domestic production, the existing production capabilities are evaluated.

5.1.1. Review of the skills available in metal working in the areas of casting, forging, machining, welding, sheet metal working, treatment, finishing and assembly.

5.1.2. Review of the basic engineering facilities available such as foundries, forges, tool rooms, heat treatment, plating shops, etc.

5.1.3. Examination of existing production facilities for the manufacture of capital goods/plant equipment products.

5.1.4. Study of labour use and productivity of labour at tasks level and plant level.

5.1.5. Assessment of other technological capabilities.

5.1.5.1. Assessment of engineering design capabilities, availability of staff, prototype testing facilities, etc.

5.1.5.2. Evaluation of quality of engineering products, quality control practices, etc.

5.1.6. Review of management systems and practices including general manpower, production control, financial management, etc.

5.1.7. Based upon the above analyses the existing production capabilities are evaluated. A quantitative evaluation of the capabilities by giving assessment scores to the various production factors may be considered.
5.2. Evaluation of progressive domestic manufacture.

Based upon the evaluation of existing capabilities the potential for progressive domestic manufacture are identified as follows:

5.2.1 The capabilities required including design ability, research and development, manufacturing skills, production facilities, basic infrastructure, etc. for the manufacture of selected groups of plants equipment and other capital goods are assessed.

5.2.2 The required capabilities are compared with the existing ones and the constraints are identified.

5.2.3 The physical infrastructure required, the skills to be generated and the necessary training activities are indicated.

5.2.4 The final requirements for progressive domestic manufacture are identified.

Chapter VI. Analyses and Initial Consideration of Relevant Strategies and Policy Measures Required to Stimulate/Support the Establishment and Development of Selected Plant Machinery and Equipment Industries

6.1 Formulation of options for industrial strategies intended to stimulate the development of plant equipment industries based i.a. on the experience of other developing countries (Mexico, Brazil, India, the Republic of Korea).

6.2 Trade policies and international co-operation in regard to transfer of technology, joint ventures, licensing, etc.

6.3 The role of public sector enterprises as suppliers and purchasers including procurement policies for the government sector.

6.4 Incentives for establishing linkages between general industrial policies and policies fostering the growth of the plant equipment production.
Chapter VII. Outlines of a Possible Programme of Action for

7.1. In-depth independent in-depth analysis of selected group of plant equipment in
order to establish the viability of a stage-wise development programme of
the sector.

7.2. An outline for a tentative programme of action for a possible phased
manufacturing programme.

7.3. Formulation and further analysis of appropriate policy measures conducive
to the development of the plant equipment sector.

Chapter VIII. Conclusions and Recommendations
1. Introduction

The Fourth Development Plan of Indonesia is likely to bring a change in the pattern of industrial development as a response to constraints and new opportunities emerging from the past industrial growth in basic and consumer goods industries. After a period of broad industrialization the manufacturing sector in the coming years will increasingly be directed towards achieving a more integrated and efficient structure of production. This implies, inter alia, the strengthening of inter-industry linkages, including the development of upstream and downstream activities and the build-up of the capital goods sector.

Indeed, the rapid growth and development of the Indonesian economy has led to rising demand for capital goods and unfolded opportunities for the development of domestic plant processing machinery and equipment as well as a widening range of other engineering goods industries.

The large-scale industrial development projects, planned inter alia in the field of pulp and paper, iron and steel, petrochemicals, cement, sugar, refinery, energy generation, etc., require a wide variety of engineering goods and thus constitute a basis for the further development of the capital goods industry. This development appears particularly justified in view of the circumstance that existing industry producing plant processing machinery and equipment are old and technologically outdated. New investment in this field in recent years has been rather limited and mainly confined to assembly and repair activities.

The Government sees the need to examine to what extent future large scale industrial projects could stimulate the national production of plant processing machinery and equipment.
The objectives of the study are to analyse the prospective development of the key producing plant processing equipment for the coming 10 - 15 years, and to assess the scope for developing selected groups of these industries, inter alia, on the basis of demand projections.

The study will include a review of the role of processing equipment industry within the overall framework for industrial development in Indonesia, as the basis for preparation of the Industry Chapter of the Fourth Five Year Plan 1965/66 - 1969/70. The study is to provide a basis for subsequent detailed technical and economic studies. The study may also serve as a basis for future co-operation in the field of industry among the Government of Indonesia, IIEP and UNIDO especially in connection with the technical assistance programmes envisaged for April 1963.

3. Scope of Work

The study is to comprise the following elements:

1. Assessment of overall prospects for industrial development in the coming 10 - 15 years. This assessment will be largely based on available data and analyses.

2. Assessment of the role of the plant processing equipment industry in terms of present production capacity, value added, skills, design and engineering capabilities, company structure, etc. This assessment is expected to be largely based on previous work undertaken primarily by the World Bank concerning development prospects for the engineering industries.

3. Preparation of rough estimates of demand for major categories of plant processing equipment. The demand estimates will be based on initial analyses of import data on major categories of capital goods over the last ten years, estimates of planned investment in machinery and equipment, in key manufacturing sectors, such as: sugar, fertilizers, cement, pulp and paper, iron and steel,
3. Analysis of each one of the magnitudes of requirement for various categories of spare parts, and an inter-country comparison.

4. On the basis of the above order of magnitudes for future demand, the preliminary identification of major clusters of processing machinery and equipment which may eventually lend themselves to domestic production and which therefore would be subject to subsequent detailed analyses. These clusters may comprise among others the following:

a. Special purpose machinery and equipment for manufacturing industry, such as sugar, fertilizers, cement, pulp and paper, iron and steel, spare parts for repairs.

b. Equipment for energy sector, oil refinery and mining.

c. Machinery and equipment common to all industries.

5. Analyses and initial consideration of relevant policies and institutional measures required to stimulate/support the establishment and development of selected plant processing equipment industries, in particular:

- trade policies
- procurement policies for the Government sector
- the role of public sector enterprises as suppliers and purchasers
- incentives for establishing linkages between general industrial policies and policies fostering the growth of capital goods production.

6. Outline of a possible programme of action for:

a. in-depth techno-economic analysis of selected groups of plant processing in order to establish the viability of a stage-wise development programme of the sector.

b. the formulation of appropriate policy measures conducive to the development of the capital goods sector.
4. The schedule for preparation of the study

The duration of the study will be three months as follows:
- six weeks for data collection and analysis
- two weeks for preparation of draft report
- one week for discussion of the draft report
- three weeks for preparation of the final report

The starting date of the study would be suggested by the Ministry of Industry.

5. Experts

UNIDO has already made financial provision, through UNIDO, to provide assistance to Indonesia in the initial phase of the preparation of the Fourth Five-Year Development Plan. In this context UNIDO would provide the services of a small team of industrial economists and engineers. These professionals would be available for a total input of approximately 10 man-months. The team would include:

- one qualified economist with special experience in the preparation of market analysis;
- one technical engineer with special experience in production of processing machinery and equipment;
- one industrial economist with extensive experience in the development of capital goods industries in developing countries;
- short-term consultants as required.

The team would work in close collaboration with a team to be appointed by the Ministry of Industry and including the corresponding industrial engineers and economists specializing in the capital goods sector, statistical staff, research assistants and secretarial staff. Close cooperation will be maintained with the study team on the engineering industry to be financed through the World Bank.
6. Reports

The draft report should be submitted in English in ten copies nine weeks after commencing work.

The final report should be submitted in twenty five copies three months after commencing work.

All specifications, units, quality gradings etc. are to be in conformity with ISO standards.