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## OCCASION

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	Estimated Annual Return on Equity	Estimated Annual Return on Debt	Estimated Annual Return on Capital Expenditure	Estimated Annual Return on Working Capital	Estimated Annual Return on Property	Estimated Annual Return on Pension Fund	Estimated Annual Return on Other Assets	Estimated Annual Return on Total Assets
1. Estimated return on equity from financial statements	10.0%	—	—	—	—	—	—	10.0%
2. Estimated return on debt from financial statements	—	—	—	—	—	—	—	—
3. Estimated return on capital expenditure from financial statements	10.0%	—	—	—	—	—	—	10.0%
4. Estimated return on working capital from financial statements	—	—	—	—	—	—	—	—
5. Estimated return on property from financial statements	—	—	—	—	—	—	—	—
6. Estimated return on pension fund from financial statements	—	—	—	—	—	—	—	—
7. Estimated return on other assets from financial statements	—	—	—	—	—	—	—	—
8. Estimated return on total assets from financial statements	10.0%	—	—	—	—	—	—	10.0%
9. Estimated return on equity from property investment	10.0%	—	—	—	—	—	—	10.0%
10. Estimated return on debt from property investment	—	—	—	—	—	—	—	—
11. Estimated return on capital expenditure from property investment	10.0%	—	—	—	—	—	—	10.0%
12. Estimated return on working capital from property investment	—	—	—	—	—	—	—	—
13. Estimated return on property from property investment	—	—	—	—	—	—	—	—
14. Estimated return on pension fund from property investment	—	—	—	—	—	—	—	—
15. Estimated return on other assets from property investment	—	—	—	—	—	—	—	—
16. Estimated return on total assets from property investment	10.0%	—	—	—	—	—	—	10.0%

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Industrial Survey

1. The Government of India has been engaged in industrial development of selected areas in the country. The Ministry of Industry has issued a circular to all State Governments to conduct industrial surveys by the National Institute of Industrial Survey and Development (NIISD) in their States. A report has been prepared for each of the States surveyed. The report contains information on the available land, the data used as basis for the survey, the industrial potentialities, the areas suitable for preliminary definition of projects, the types of industries which can be developed, technical and economic viability of the proposed projects, the capital requirements required for formation-based enterprises, the cost of production, the market potential as well as specific information on raw materials, labour, power, transport, availability of available technology and process equipment, cost of plant and machinery, construction specifications. United Nations expert assistance in the field of forest-based, forest-based industries and mineral-based industries in the States of Bihar, Orissa, Madhya Pradesh and Mysore has been agreed upon. Later on, it was agreed that the project could be extended to other States and areas of interest. The intention was that the reports shall be authoritative and comprehensive enough to serve as basis for consideration by investors for industrial participation.

2. The preparatory work and discussions took place in India. The project commenced in January 1965 when Mr. Miller, United Nations Senior Technical Consultant, came to India and began the work of final preparation of proposed studies for the selection of subjects for examination. The NIESD was chosen as the institutional base for the counterpart work at the centre, since its association with counterpart units in the relevant States was contemplated. The sponsors of the project were the State Governments while the Planning Commission functioned as co-operating Government of India agency.

3. After discussions with the State Minister for Industry and Commerce and officials of the Departments for Forest, Geology, Mining and Mineral Resources, the following lists of industrial projects were drawn up:

For Mysore

Ferro-chromium	Pulp and paper
Welded steel pipes	Fibre-boards
Aluminium	Saw-mills
Plate glass	
Silicon carbide and abrasive tools	
Foundry pig iron	
Refractories	
Pelletising plant	

Proposed Projects

1. Paper Mill  
2. Cellulose Mill  
3. Pulp Mill  
4. Plate Glass  
5. Pulp & paper  
6. Chemicals

Proposed Projects

Structural steel Corrugating plant  
Central pulp plant

It was also reported that, in addition, the following projects may also be contemplated:

1. Tissue paper      )  
2. Corrugated      ) for both Madhya Pradesh and Jysore  
3. Cellulose      )  
4. Chemicals      )

Although each industrial specialist was expected to develop his report along the lines of his own experience, the following items were to receive special attention in each report:

- (a) General considerations: Statement on the scope of the industry project; its importance for the relevant State and for India as a whole;
- (b) Market and demand for the products of the project: Current and future estimates based on data made available by the NCAER, the Planning Commission and the State Ministries concerned.

1. The project was to be implemented by the United Nations Economic Commission for Asia and the Far East (ECAFE) in collaboration with the Government of India. The project was to be carried out in two phases. The first phase was to be completed by December 1965 and the second phase by December 1967. The project was to be implemented in three stages. The first stage was to be completed by December 1965 and the second stage by December 1967. The third stage was to be completed by December 1969.

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### The conditions and expectations

5. At the beginning of the project work, several factors were considered favourable. The States were anxious to have a technical mission for prospective industrial development within the framework of their five-year plan. The United Nations Development Programme - UNDP - was appointed as senior consultant for the project study. The Project Committee and the sponsor organization were fully with very much enthusiasm. With its power, the institutional basis institution - NIDR - was represented by a highly esteemed organization with experience in technical surveys and finally there were promises by the States concerned with the NIDR that they will provide the necessary counterpart, i.e. human and material support for the United Nations experts and give priority to the studies of the project.

6. Naturally, all the expectations set into the project work could not be fulfilled. The project leader left India after three months, before the experts arrived in the field to start their work. The expert on aluminium who arrived first, received counterpart assistance but was unable to establish contact with the future users of his report (States). Other experts were supported by junior-level counterparts without co-ordination and firm guidance or directions for the work. The last two experts also were hampered in their work by a lack of counterpart and interest in their studies. At

Mr. T. P. K. Martin

Project Manager, Feasibility Study

Ministry of Industries, Government of India

Government of India, New Delhi - 110001

Report on Feasibility Study

The present report is the final output of the Feasibility Study on the proposed project of setting up a paper mill at Madras. The study was initiated in May 1966 and completed in December 1967. The study was conducted by a team of experts from the Ministry of Industries, Government of India; Paper and Pulp Research Institute, Deemed University, Deemed University, Patna; Regional Engineering College, Rourkela; and the Kharagpur Institute of Technology, April 1967. The cost of the project is Rs. 100 million (Rupees One hundred million) and the estimated time of completion is 18 months.

(a) I have written three reports during the course of the implementation of the experts in assisting the Ministry in respect of the following industries;

(i) Annexes to the consolidated report which include: summaries of the reports and supplementary information furnished after the compilation of the reports; a review of the background and organization of the project work; code for the organization and procedure of such projects; guideline for feasibility studies; and proposals for the preparation of a manual which will facilitate the work on feasibility studies;

(c) I have written also three other reports: a General Report on the problems and achievements in the work, including information on other specific questions which are not to be found in the consolidated report (new plan of studies, extra work of project personnel and questions of United Nations Technical Assistance and organizational problems of it).

13). I am thankful to all who appreciate the work of the project and give generous assistance and help. It is not possible to mention them individually. The volunteers deserve special thanks. I wish to emphasize the hard and co-operation from the experts who give me invaluable advice and suggestions for my reports and execution of my duty.

... by the most important reports are  
presented in the following pages.



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Babu - 361

24 Recommendation 10: The Board of Directors should consider the following recommendations:  
the Board of Directors should consider the following recommendations:  
boards) with respect to the amount of time spent by management in the performance of  
recommendation, it is necessary to have the time required for the conduct of the  
Chairman - Executive Committee. The amount of time required depends on the complexity of  
spends in the production and consumption of the product by management  
is taken up, the recommendation is fully implemented.

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10. The following table shows the number of hours worked by each of the 100 workers.

10. The following are the names of the members of the Board of Directors of Forest Products Corporation, Inc., of which Mr. John W. Hardin is President:

15. The following recommendations are made:  
a) To support the proposed expansion  
of the plant at present areas or  
to construct new areas in southern and western  
parts of the plant. This will permit further develop-  
ment of the plant in order to satisfy local  
and foreign markets.  
b) To expand the existing plant at

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The Committee to be composed of four members, suggestions, information, and my thanks, which I have submitted to find out the possibilities of carrying the same into effect, and that the implementation of the proposed scheme will be left to the Government of the

- (c) Surveys of the production of new materials;
  - (d) Investigations on infrastructure and other supporting facilities (roads, ports, delivery materials and the like);
  - (e) Measures for improving the national economy;
  - (f) Studies on market availability and export potentialities;
  - (g) Investigations on the utilization of by-products and the setting up of by-products-based industries;

(c) Encourage industrial units, particularly those in the iron and steel industry, to take up the use of waste materials.

(d) Impose taxes on the use of materials which are not recycled and encourage their use.

(e) Encourage the use of waste materials in the production of building materials.

### Alloys

- (a) Encourage the use of scrap metal in the production of new metal products;
- (b) Investigate the use of waste materials in the production of alloys such as brass, copper, etc.;
- (c) Investigate the use of metal slags in the production of mainly heat-tolerant, relatively inert refractories;
- (d) Study the possibility of using discarded materials as raw material.

### Foundry sector

- (a) Secure information on the production of foundry coke for the production of steel;
- (b) Secure information on use of foundry coke in the production of products.

### Ferro-alloy

- (a) Conduct a pilot study in Maharashtra and in Madhya Pradesh;
- (b) Utilise the waste and scrap manganese ore in Madhya Pradesh;
- (c) Study beneficiation and upgrading of chromite or iron ores;
- (d) Construct a pilot furnace in Bhadravati for pilot testing of ferro-alloys;
- (e) Investigate production of low-carbon ferrromanganese in Madhya Pradesh;
- (f) Attempt to use soft coke for ferro-alloy production.

### Pulp and paper

- (a) Use a mixture of raw materials;
- (b) Investigate wood species not utilised until now for production of pulp and paper;
- (c) Increase planting of specific species, especially eucalyptus;
- (d) Investigate different technological processes suitable for domestic purposes and raw materials;
- (e) Investigate the economics of straw collection and use;
- (f) Send specialists abroad for additional training and experience.

Table - 24

- (a) The following products should be prioritized with exemption in view of their future work, furniture);
- (b) Steel products, heavy electrical engineering, basic metal products;
- (c) Industrial products of the following imported raw materials (steel, coal, iron, copper, rubber, and mineral consumption);
- (d) Exports of the following products required for the production of industrial products in India;
- (e) Manufacturing products of the metallurgical industry.

Table - 25

- (a) Industrial products of the paper and pulp industry;

Findings

34. According to the reports, initial suggestions for and information on operation practices and improvement of the existing industries in the relevant fields. The reports on mining, cement, ferro-alloy, and pulp and paper comprise observations and evaluations of the plans for the expansion of existing mills and of projects for new production capacities. In the case of Madhya Pradesh, suggestions are made for investigating the flow of the rivers for water supply and effluent disposal. Suggestions are also made for tracking of energy supply and its costs, especially in the region of Madhya Pradesh, and for studies on the dependence of production cost on the price of energy (see ferruginous and manganese reports).

**II. ANALYSIS OF POSSIBLE RESULTS AFTER IMPLEMENTATION**

35. To support the said decision, it is necessary to analyse the contemplated (possible) results after the implementation of findings and recommendations. On the ground of the analysis and elaborations given in the reports, this can be done only partially. In the end this remains the task of the potential implementors: to continue collecting and supplementing data and making more calculations in order to verify opinions and justify decisions. Primarily, the recommended production, employment, investment and equipment supply should be analysed, as well as the increase in knowledge and experience. In the two following chapters, the technical and economic feasibilities will be surveyed and analysed with respect to the specific domestic conditions and circumstances.

Production

36. The following table gives the existing and planned production of various products and planned ones in the country.

Suggested existing and planned production  
(in thousands of tons)

<u>Product</u>	<u>Existing</u>	<u>Planned</u>	<u>Existing</u>	<u>Planned</u>
Aluminum metal	—	—	—	—
Pig iron (foundry) after 1970/71	—	—	—	—
Ferro-chrome	—	small quantity	not available	not available
Silico-manganese	—	small quantity	not available	not available
Electrolytic-manganese	—	—	not available	available
Coke of non-coking coal	40 (t/coal)	not available	not available	not available
Pulp and paper	✓	160 (paper)	✓	110
Hard-board	25	50 capacity 30% of production available	not available	not available
Structural steel	30	300	1100	2000
Steel pipes and tubes	20 (M.P.) 34 (Mysore)	41	900	1500

✓ Pig iron for sale taken as the existing and planned production.

✓ Rice straw paper.

37. It is noted that:

- (a) the recommended production refers to basic and intermediate products necessary for manufacturing industries and construction, i.e. to products which are on demand in India and of which some still have to be imported (pulp and paper, ferro-alloy through alloy-steel);

- (3) The recommended implements suit the modern large-scale production, which prevails a better economic and technical utilization of industrial activity in India and which does not yield the prerequisites for the current stage of India's development;
- (4) It is feasible to realize the recommended projects (pulp and paper, aluminium, fibre-board, factory pig iron, soft iron, steel structures and steel pipes) because of domestic experience and available know-how and technical skills in existing production;
- (5) The recommendations for the other two projects are feasible to be taken up after some additional tests have been carried out by the technical staff existing in the field (silicon-aluminous and ferr-chrom);
- (6) Any firm or project (electrolytic manganese) foreign will be assisted in know-how will be necessary to start production (some research work is already been done or is in progress in the country).
35. Most of the recommended projects play a complementary role in India's development and the multiplying effects of implementation will be considerable in the manufacturing industries. The investment capability of the Indian industry (steel structures, steel pipes, ferro-alloys, foundry pig iron and finished aluminium goods), and the export promotion drive will also be effected. The recommended products (aluminium, steel pipes, fibre-board, pulp and paper) is a help to increase the standard of living.
36. From the point of view of more utilization of domestic resources (material and human), the importance of implementing recommended production cannot be over-emphasized.
37. Implementing production involves the import of auxiliary material in few cases (e.g. for fibre-board, some portion of electrodes for aluminium, and temporarily some chemicals). All of the imported materials can be balanced with the export of commodities (the policy of linked import-export).
41. The new recommended production also provided answers to the need of promoting the export of intermediate and finished goods (aluminium, ferro-alloys, foundry castings, alloy steel castings, aluminium processed products, electrolytic manganese etc.), as well as of some high-rated products and commodities such as furniture, paper products, aluminium utensils and so forth.

42. Regarding the size of production and interchangeability of the product-mix, many factors still need to be investigated, but in the majority of the reports alternatives are given, suitable for partial implementation of the recommendations (aluminium, steel structural fabrication etc.), for changing the product-mix to meet varying market conditions, and to keep capacities fully utilized (ferro-alloy, foundry pig iron, steel structural fabricating, steel pipes and so on).

43. During the discussion on preliminary findings and in the follow-up comments, the recommendation on the quantity of aluminium production in 1976/77 has been questioned as an underestimate, but this must not be taken as essential since this will be proved or disapproved in the course of practical implementation and experience.

44. Regarding the location of production, the areas of mineral and forest-based industries which were examined are resource-based and so linked primarily to the raw material locations. There are discussions and recommendations in the reports on alternative sites although they are without sufficient calculations and are subject to further investigation.

45. Finally, the reports allow for follow-up research before making a final decision, and also encourage the development and improvement of the production (quantitatively and qualitatively) after the decision has been made and production executed. In some reports this is stated explicitly (ferro-alloy, pulp and paper, fibre-board, low-temperature carbonization), but all of the reports suggest further research for the implementation of new raw and auxiliary materials, improvement of technology and so on.

#### Employment

46. The question of employment is not elaborated in the reports for three reasons. Firstly, only high capital intensive industries were examined; secondly, the maintenance and ancillary shops are not discussed in full detail; and thirdly, six out of ten products recommended are based on the prerequisites and labour does not come into question. Nevertheless, in some of the reports, the type and number of labourers required are indicated.

41. The additional externally recommended give opportunities for employment in supporting industries and in the field of raw materials (bauxite mining, wood extraction, re-mining etc.). The implementation of recommended production will result in new employment in processing industries and construction work. Therefor, the multiplying effect of employment would be considerable and more beneficial for the provision of employment in the country.

42. The suggested industrial and employment opportunities for all types of labour, particularly for the semi-skilled and unskilled who could be trained for a particular job. The latter type of employment is particularly important in the regions where under-employment is considerable (Ranpur District and other parts of Bihar, Pravast and Deccan in Mysore). The productivity of labour is suggested will be very high, especially in aluminium. In steel structures a 300 percent increase in productivity is contemplated compared with the existing conditions in the country.

43. In some of the reports, the problem of training and expanding the experience of personnel has been discussed. The ferro-alloy and fibre-board reports make a suggestion for training the craftsmen to promote the consumption of the products. In all reports the increase and improvement of skill and working techniques is suggested implicitly by the implementation of new technologies and techniques.

#### Investments

50. The data on estimated investments is given for some products in table 2.

51. The investment costs are indicated to a sufficient extent in some reports, or a model calculation is given where the circumstances have not allowed the strict calculation of investment costs owing to a lack of data or costs of necessary equipment. In the aluminium report, the detailed investment costs are given with respect to standard up-to-date equipment. This may vary depending on the technological properties of raw materials and locations, but the usual margin in estimating costs allows for these differences. Costs are given in detail for investments required for many alternative cases of industrial development in different regions. In some of the reports, estimates are given after consultation with foreign suppliers or tenders (steel structural fabricating, fibre-board and so on).

Investments

Product	Investment in millions of rupees	Domestic supply in millions of rupees
Aluminium (when available)	100	100
Big iron (pelletizing plant at 1,000,000 tons)	100	100
Ferro-silicon	-	100
Silico-manganese	-	100
Electrolytic-manganese	-	100
Coke from non-coking coal	10	100
Pulp and paper (rice straw paper 66,000 mill. tons)	100	100
Hard-board	10 (from 1,000 tons)	100
Structural steel	14 (domestic supply)	158 (imported supply)
Steel pipes	14 (Mysore) 6 (M.P.)	10 million rupees

a/ Including beneficiation plant

b/ Pre-devaluation

52. A common characteristic for all the reports is an uncertainty as to the domestic supply costs. These estimates, therefore, are subject to later revisions and check-ups, at which time the possibilities of implementation will be examined. Despite this uncertainty, the experts have tried to estimate, but not to exceed the now prevailing investment costs in India, and have calculated savings compared with the investment costs. But that does

53. The structure of investment in the projects in the case of fibro-board, ferro-alloy, steel structures fabrication, and pulp and paper, is not clear. Naturally, the structure of investment will depend on the characteristics of the township, the nature of the products and so on.

54. The structure of investment will depend on the existing in the country industrial base, the availability of labour force and its protection for which the Government has to take care. In the industrialisation, it is well known that the cost of investment per unit depends on the size of the plant.

55. The structure of investment in infrastructure and other important facilities (power, water supply, roads, bridge, port, etc.) and the like are given wholly in broad terms. In the report on aluminium, this aspect is mentioned briefly, while the amount of water is not elaborated. These investments must be examined thoroughly before making a decision on the project.

56. The proposed investment part of the recommended investments in phases (indicated in the reports in greater detail where there is a scarcity of finance or demand for the product - aluminium, ferro-alloy, steel structures fabrication, ferro-board and pulp and paper and so on.) The approximate form of investment is suggested in lines. This has to be elaborated in project more precisely, and at a very important point in the sequence of investment and financing plan of investment is given by the schedule only in the fibre-board report.

57. The working capital component of investment has not been elaborated except in two cases, mostly owing to a lack of criteria and data. In some cases such an elaboration was not relevant.

58. The structure of investment (buildings, equipment and others) is elaborated to various extents in some of the reports (aluminium, fibre-board, steel structures fabrication, ferro-alloy), and it seems that the portion for buildings (including townships) could be lowered, assuming Indian conditions and prices remain the same.

59. In developed countries, the structure of investments is led in order to minimize building components and, depending on the type of industry, it may be decreased to a low percentage. This is one item where a saving in

57. It is difficult to estimate the exact amount of investment required for the industry for the next half decade. This is because the available funds available for the industry are limited and the rate of interest is high. The industry will have to depend on foreign investment like that of the U.S. and Japan. The industry will also have to develop its own internal resources. The existing industries (like the textile industry) have a low capacity utilization and are not able to meet their demand. The industry will have to depend on the government for the development of the industry, and the government will have to provide incentives for the other industrial areas.

58. The alternative investment estimates for the project are given and equipment needs to be imported. In the present reports, the sufficient details are not given. The project reports give the project reports for a better understanding of the industry, the exchange or investment services.

59. Investment estimates and requirements are given in the report on aluminum. In the report on ferro-alloys and steel plants, investment is discussed with respect to the existing plants, new plant investment for expansion in the existing mills and the import of scrap and paper. The other investments are recommended by the project reports (Bailadilla, straw paper in Balasore, copper and iron casting, steel plant in the vicinity of Bhilai and so on.) The requirements of investment in infrastructure and other facilities are listed but not calculated quantitatively. However, the list of requirements is thus given in some reports is sufficient for calculating more accurately in the project reports later time.

#### Supply of equipment

60. In suggesting the supply of equipment, the proportion between foreign and domestic components is given in percentages. In some cases, specific equipment which needs to be imported is distinguished. It is possible that in a changing Indian industry the suggested domestic components are underestimated. The lack of data and experience seems to be the major factor responsible for this, but it is possible to rectify this according to the project reports.

61. Alternatives are not given to the equipment supply suggestions, which would be important in the choice of equipment with respect to the variations

15. The first step in the process of assessment and product development is to identify the target market. This involves understanding the needs and preferences of different consumer segments. It's important to have a clear understanding of who the product is intended for and what they want to achieve with it.
16. Once the target market is identified, the next step is to conduct research to gain a deeper understanding of the market. This can involve surveys, interviews, and analysis of existing data. The research findings will help in identifying opportunities and challenges, and in developing a strategy for product development.
17. The third step is to develop a prototype or a sample product. This allows for testing and refining the product before it is launched. It's important to have a clear idea of the product's features, benefits, and how it compares to existing products in the market.
18. The fourth step is to plan the launch and distribution strategy. This involves determining the best channels for distribution, setting prices, and creating promotional materials. It's important to have a clear understanding of the market and the competition to make informed decisions.
19. The fifth step is to monitor and evaluate the product's performance. This involves tracking sales, customer feedback, and other key metrics. It's important to have a system in place for collecting and analyzing data to make informed decisions about the product's future.
20. The final step is to continuously improve the product based on feedback and market trends. This involves staying up-to-date with industry news, conducting further research, and making changes to the product as needed. It's important to have a culture of innovation and a willingness to adapt to change.

10. The report is also intended to assist the industry in its efforts to develop a more effective industrial policy. It is felt that the report will help to identify the problems which must be faced by the industry if it is to compete effectively in world markets.

11. The report is also intended to assist the industry in its efforts to develop a more effective industrial policy. It is felt that the report will help to identify the problems which must be faced by the industry if it is to compete effectively in world markets. The report is also intended to assist the industry in its efforts to develop a more effective industrial policy. It is felt that the report will help to identify the problems which must be faced by the industry if it is to compete effectively in world markets.

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13. The report is also intended to assist the industry in its efforts to develop a more effective industrial policy. It is felt that the report will help to identify the problems which must be faced by the industry if it is to compete effectively in world markets.

14. In the other reports, there is enough information and material for propagandists to know each other's strengths and weaknesses, and to continue the struggle among the same lines.

## XII. INTERNAL SECURITY MEASURES

15. For all of the ~~internal~~ industrial agents, technological processes are available which are applicable to the technological properties of raw materials and it is possible to reduce the appropriate technology to suit the technological and commercial requirements for efficient and effective, for

74. The quality of the products of the industry and the applicability of technologies has not been proved by laboratory and pilot plant tests of all deposits and grades. The quality of the products is measured by insufficient data and ~~and~~
75. The technological importance of the industry and the applicability of technologies has not been proved by laboratory and pilot plant tests of all deposits and grades. The quality of the products is measured by insufficient data and ~~and~~

the Government Supply section of the paper. The editor of the paper,  
Mr. [redacted] and Mr. [redacted] were interviewed by the reporter  
and he was asked to be responsible for the statement. The reporter  
suggested to Mr. [redacted] that he might be responsible for the statement,  
as well as other reporters, as well as for the back page of the paper.  
Mr. [redacted] denied this, however, [redacted] was not present  
when it was suggested the editor of another office paper, [redacted]  
was mentioned in the "Government Supply" section, the editor's response  
determinedly stated that the editor of [redacted] suggested to him in the  
course of the reported interview that he [redacted] to one of the [redacted]

100% P7-3F =

Figure 1. The relationship between the number of species and the number of individuals per species.

PHOTOGRAPHIC FILM

ANSWERING YOUR QUESTIONS  
THE FIVE QUESTIONS

— 1 —

1. *Georgian* 2. *French* 3. *Spanish* 4. *Portuguese* 5. *Italian* 6. *Swiss*

卷之三十一

卷之三十一

1. *What is the relationship between the two variables?*

1 2 3 4 5 6 7 8 9 10 11 12 13 14

For the first time, we have shown that the *liver* is a major site of *in vivo* synthesis of *IL-10*.

1. The following evidence is given to prove the

**Start and start .** The productivity

## THE MUSEUM IN THE REPORTS

\* The suggestions are still scattered up and down.

### **Part II: The effect of competition on competitive mi**

the  $\text{P}_\text{H}_2$  and  $\text{P}_\text{O}_2$  product, since this

#### Chronic Prostaglandin Therapy

The Indian paper industry has been recommended previously by the Commission to the extent of encouraging the Government to take steps to develop the industry. This is particularly important in view of the fact that the paper trade, especially in the case of the paper mill, is not yet developed to those in Europe and America which have paper production which is usually more than twice as much as ours (e.g., Germany, Britain, pulp and paper). In India, the paper industry needs to be improved (fibre-board, paper-board), and in this connection for improvement of the operational efficiency there is a need to import the best quality of timber (softwood). That is necessary for the large-scale production of paper products (cotton, jute, structural board, pulp and paper) and for the manufacture of paper in other industries (fibre-board, fibre-board). The exports of such semi-finished items of the Indian counterparts abroad (fibre-board, paper and paper), and/or increasing the assistance of foreign experts and

It is often the case that elements have to be re-arranged, **structural** at least, before they can be used. This is particularly true of the **array** elements, which are usually stored in memory as a sequence of bytes. In order to use them for computation, they have to be converted into a form which is more convenient for computation, such as a **matrix**. This is done by **transposing** the array, which is a process of rearranging the elements of the array so that they are arranged in a different way. For example, if we have an array of size  $n \times m$ , where  $n$  is the number of rows and  $m$  is the number of columns, then transposing it would result in an array of size  $m \times n$ , where the elements are arranged in a different way. This is a common operation in linear algebra, where the transpose of a matrix is often used to solve systems of linear equations.

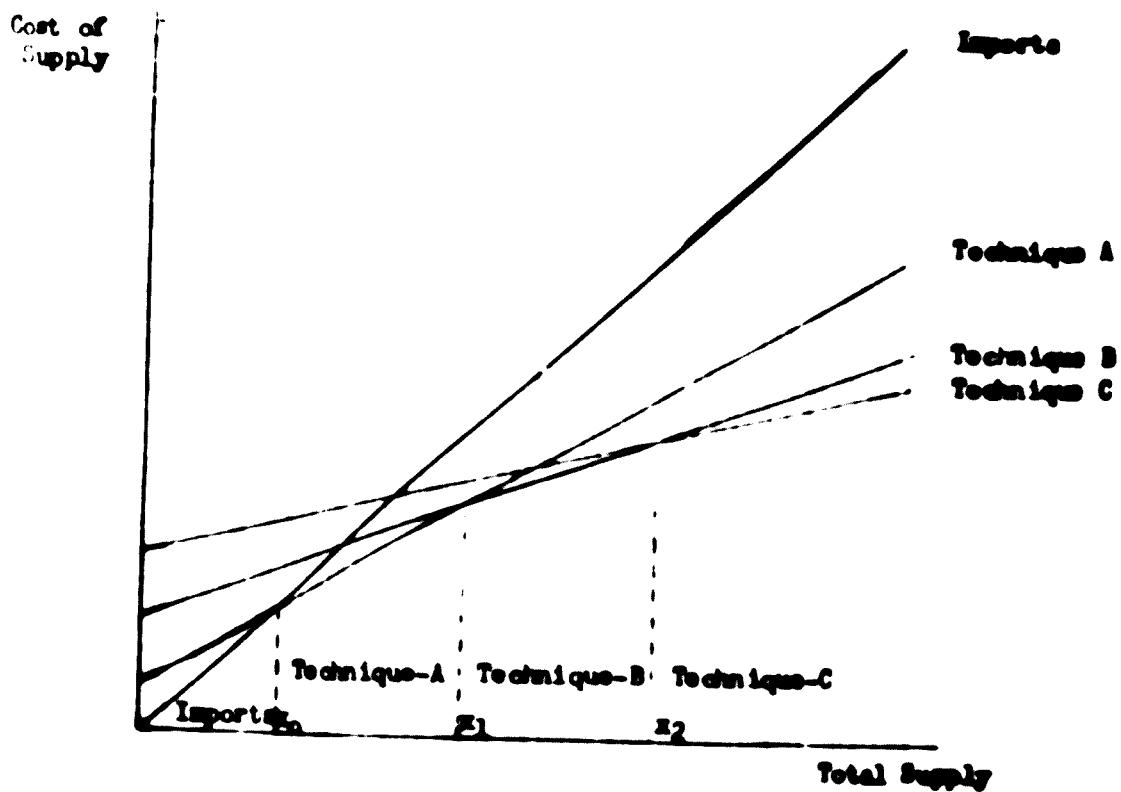
The implementation of the integrated technology has led to significant improvements in variability of crop yields with a maximum yield increase of 18% in some cases when comparing yield and irrigation application rates. The implementation of the new irrigation products, knowledge of the irrigation system operation and, especially, new irrigation technology, has resulted in improved irrigation efficiency, which can be demonstrated by the fact that through three years of trials on small plots the yield of wheat with improved varieties, when using irrigation systems, has increased by more than 10% at the cost of irrigation water costs and more energy consumption per unit of product. This means that there is a trade-off between quality production and higher levels of irrigation.

(1) The use of laminated glass cannot fail to increase the economic viability of the industry's production. The laminated industry is a partially developed industry. In question comes from Madhya Pradesh: will the steel industry accept such a suggestion? This proves that knowledge is not available in the engineering industry, since that product is no longer a puzzle in the structure of ferromagnetically transmutation in the world.

17. It has already been mentioned that with respect to the supporting industries, further investigation is needed into the availability of

- (a) industries for equipment supply;
  - (b) industries for supply of raw and other materials;
  - (c) industries for maintaining;
  - (d) consuming industries and
  - (e) industries for construction work.

Figure 1  
Choice of technique



Sources: United Nations Development Programme Technical Report No. 2 - Formulating Industrial Development Programs and ~~Planning~~ of the Second Group of Projects - 1970 - 1981, with special reference to Asia and the Far East.

#### IV. ECONOMIC FEASIBILITY AND ECONOMIC RESULTS ANALYSIS

83. Economic feasibility of a product or process indicates whether or not it is "commercially profitable". National economic profitability may differ greatly and it is helpful in considering international economic feasibility. This is particularly important in developing countries where it is not an easy thing to do.
84. The analysis of economic feasibility is a complex and difficult consideration because of the uncertainty caused by the different sources and availability of data, and because of the fact that it is for different locations, suppliers or prices and the trend in market behaviour. The impact of world market prices, national economic policy (e.g. taxes, duties, investment policy, monetary policy on inflation) and foreign policy are very often the causes of uncertainty in computing economic feasibility. The fluctuation in economic stability and balances also cause variations in economic feasibility figures.
85. Taking into account the above facts, it is necessary to collect as much data as possible, to investigate and process these data in order to obtain a great number of indicators and alternate computations to prevent misleads and miscalculations. This is the job for local specialists who may be fully conversant with the changing situations and may have thorough experience in and knowledge of the prevailing facts. The foreign expert can also help and should be responsible for all technical data relevant to the costs and economics of the recommended production. He may also be able to help in dealing with the problems of factor costs and in offering experience from the main producing country and world market. His contribution may be a decisive one in completing successfully the economic feasibility analysis.
86. The number and selection of the indicators for the economic feasibility analysis might be disputable, but the production costs and sale prices as compared with the world market prices do not usually serve the purpose fully.
87. The list of indicators varies from product to product, but there are general indicators which can be used in all cases. It is advisable to select first the indicators to be used for calculating economic feasibility in the country itself for the given project. A comparison with the indicators in developed countries is a good means of correction, and is very important for export promotion and import substitution. Some indicators should be selected

by which economic feasibility and profitability may be tested in consumer industries, it must prove economic feasibility not only in comparison with the prices of a given product, but also in its consumption profitability. The economic results of implementation for the State or for the whole industry should be the part of this economic feasibility analysis. The taxes and the ex-factory price for the State and the tax savings increase should also be analysed, and may prove useful as supplement to the standard economic indicators when financial ramifications and other investors discuss the report.

#### Indicators of economic feasibility

(a) The projected cost of a price per unit has been computed or estimated in all major industries or those accord to date. The costs are lower than those now existing in the country (aluminium, structural steel, fibre-board and their products where the units are less complex). This proves the proposed new project's production costs.

(b) In some reports, some indicators are given in comparison with the cost in developed countries or with the world market prices. They show that some products are already, and that there could also be, competitive with certain pre-conditions for quality and transport costs. This reveals the viability of the projects, but there is still much to be done before implementing since the computation of the rest of the ex-factory price does not give the complete picture. The sale cost, transport charges to the supply point, excise duties and taxes, and the rate of interest on capital loans are not ascertainable. The whole projected production belongs to raw material or construction material which is very sensible and needs flexibility, or they are dependent on the efficiency in the consumer industries and the consumers' ability to pay the price and other charges. The prices of these products are often fixed and strictly controlled by government policy; therefore production costs and prices need to be computed with greater accuracy. Of course, the expert is not to be held responsible since this is primarily the work of counterparts. Some reports indicate the possibilities of bringing down the production cost by employing methods for better utilization of capacities and improvements in operational practices and technological improvements (ferro-alloys use of capacitors, structural steel three shifts, fibre-board higher per cent of utilization and so on).

Table 3

Production cost and profitability  
(including sale cost, interest and in some cases taxes profit)  
(In rupees  
In dollars  
per ton)

Product	Cost per unit	Existing cost	World price	Profitability
Aluminium metal	2400-3000	4000-5000	\$ 1250 <sup>a</sup>	3-14% gross
Alumina	335-466	500-650	\$ 100	
Pig iron (foundry)	209	270	-	11% profit on taxes profit
Ferro-chrome	-	Not available	Not available	-
Silicon-manganese	-	Not available	Not available	-
Electrolytic-manganese	-	-	-	-
Coke of non-coking coal	30	31 <sup>b</sup>	-	Saving 11% per ton
Pulp and paper-rice straw paper	680	1500 <sup>c</sup>	-	24% gross profit on investment
Hard-board	52 <sup>d</sup>	1000	610 <sup>e</sup>	-
Structural steel	1334-2226 (average 1845)	-	1755 <sup>f</sup>	5.4 to 9.5% return 103 rupees per ton - 10% of production cost
Steel pipes	-	1190	Not available	18% return in Madhya Pradesh; 7% return in Mysore

a/ For coke from coking coal which is used at present

b/ Paper and paper-board average

c/ The price by which Sweden exports f.o.b.

d/ An offer from the USA to supply India (including shipping charges)

91. The inherent risk of high transport charges is very evident. The proposed project is likely (for ferro-alloys) to represent 10 per cent of the world market (presently 10 million metric tonnes).

92. The structure of the price or production cost is also noted in some respects in ferronickel, ferronickel, low-temperature coke), in others in ferromanganese. In some cases, some of the factors costs are assumed in variable risks or some participation.

93. The capital utilization of structures is discussed in a few cases, but a critical analysis of various investment instruments available is not off road. This would provide an improved sensitivity analysis of the structure of production cost on prices and also to more favourable alternate decisions regarding the capital investment strategy, the building of auxiliary units (furnaces, etc.), or the selection of technology and techniques, scale of production, foreign domestic supply of auxiliary materials and instruments, and so forth. It could also lead to seeking alternate uses of main raw materials and techniques (ability of units are, welding or rivet method, soft coke or charcoal, pre-baked or Soderberg electrodes for aluminium, wet or dry method for furnace, and so on).

94. The profitability has been indicated by the gross profit figure or net return on capital investment or by direct savings against the existing prices. In some cases, the profitability is compared with prices abroad. Long-term indicators of profitability are not applied, and the lowest economic profitability is not indicated. The profit and positive net return are assumed, indicating that there are necessary further improvements in operational practices, productivity and the like. (Pig iron gross profit 66 rupees per ton; 11.32 rupees, savings using soft coke for ferronickels; 9 per cent return on structural steel, 7 per cent on steel pipes and 13 per cent in Madhya Pradesh.) The experts were not able to calculate all relevant data, which is why net profit is not given. That is to be done in project reports, but from all indications, profitability is certain.

95. Value added is not applied for the indication of viability of recommended projects; that will require additional analysis with the assistance of economists.

96 The rate of turnover of working capital is important, directly or as a factor of aluminium, and implicitly when given in the absolute figures in other reports. While this indicator indicates the complexity of production of material and human resources, it should be calculated as precisely as possible, reflecting prevailing circumstances and future improvements (e.g. transportability, storage and supply, productivity and market adaptability), the efficiency of management.

97 The final indicator is that of capital-output ratio - capital-output ratio, input-output analysis, and rentability in different ways and methods could also be discussed. This indicator was computed only in the aluminium report. While this indicator condenses the selection of technology, choice of techniques, scale of production, application of foreign plant for capital or labour intensive industries, site selection etc., it should be completely analysed. Most of the output per unit of input of materials, of course, desirable up to the maximum possibilities with the chosen techniques. There are many methods to compute savings and to discover most suitable factors for maximizing it with the chosen techniques.

98 The economic feasibility of different locations is only elaborated in the aluminium report. The calculations of different micro- and macro locations in production costs are useful and will disclose differences in costs and the possibility to cut down capital expenditures and operating costs. This is important from the point of view of present conditions of the transportation and other infrastructural facilities. It is also necessary in order to meet the needs of export promotion drive.

99 The relation between national benefit analysis and economic feasibility has not been elaborated, and they need serious consideration and computation to find out the real relationship between national and commercial profitability. A benefit-cost analysis and a ratio for the country and for the region in a long-term scale should be computed and analysed. Some of the means for export promotion, foreign exchange savings, import substitution, regional development and so on should be illustrative facts and elements for computation. A seminar and workshop on this theme was held in India in December 1966 under the auspices of the United Nations and Planning Commission. Some of these projects must be thoroughly analysed and computer documented in order to discover the best site selection, technology applied, and so on. The alternatives must be computed with the different input components. Today larger projects are

not taken up at the use of computers, especially where the import in various industries is considerable (power stations, grids, metallurgical plants, etc.).

100. The problems in considering some aspects of economic policy (tariffs, customs duties, subsidies etc.) were raised in other reports. This also has to be analyzed very thoroughly, given the existing policies. It cannot play positive role in the development of some industries. On the other hand, it is possible that the system in some of the economic instruments might reveal a better range of instruments and measures favourable for economic development and revenue expansion. This might also be the case when tenders on export promotion, which may bring profit to the State. This institution has to be looked into and the necessary alternatives must be computed in order to find out the gain for the community.

101. The economic effects (in the case of implementation) on the State income, its structure and growth have not been computed. Nor are the effects on State revenue, its future potentiality for reinvestment and the development of infrastructure calculated. The lack of the above, among others, is a factor responsible for the negative comments on the practicability of implementation.

15

PART TWO - FOLLOW-UP PRACTICE

102 Before reviewing the follow-up process, it is important to define the definition, purpose and prerequisites of this process.

- (a) The methods and organization of work from the beginning are important for a successful follow-up. The responsibilities stipulated in the Plan of implementation and the responsibilities of everyone should be properly defined.
- (b) The co-operation of those persons whose support is necessary for a successful follow-up.
- (c) In the course of the follow-up many shortcomings of the report could be rectified, and new areas of knowledge and experience should be gained which will facilitate further implementation of the report and further activities in the field.

103 Careful follow-up work has not taken place, especially in the first five instances have been improved in the latest stages, but sometimes they are not as expected.

V. FOLLOW-UP ACTIVITIES

Results

104 The main follow-up actions were: (a) discussions of the draft reports; (b) discussions of the Final Reports; (c) efforts to implement the permanent and/or corrected report materials; and (d) discussions on the possibilities for implementing material.

105 Only one of the first five reports was discussed in draft form at summit. This helped to discuss new alternatives with lower-grade raw materials (1 per cent of  $Al_2O_3$  in bauxite). A discussion took place in Madhya Pradesh on the final reports, and revealed the need for an enlargement of the report, as well as additional explanations and corrections. Eventually, the attempt was made to appraise and evaluate the reports. The comments were developed by the departments of the Central Ministries and other central authorities (Planning Commission, DOTD and others), but a final evaluation was not made.

106 The last two reports - ferro-alloy and fibre-hoard - were discussed in draft form, and the preliminary findings were discussed to adjust the reports to the concrete needs and possibilities of implementation.



1. The first question concerns the ~~percentage~~ of the reports which were negative. In this connection we can distinguish between two types of negative reports. First, there are those which directly criticize the ~~method~~ of reporting the results. The negative findings are often presented as ~~discrepancy~~. This is not sufficient to get the reader to accept the ~~method~~ presented one step further. The ~~method~~ is not the ~~method~~ suggested, or even the method which was used, but it is the method which is ~~method~~ mentioned. The reading rate is the percentage of the readers of the reports who have stopped the reading. The absence of agreement on the ~~method~~ of reporting the results can also be ~~disagreement~~. Although this kind can not be considered as ~~method~~ and ~~method~~ at the ~~same~~ time, they appear to be important factors in addition through interpretation and ~~method~~ analysis.
2. There is one problem I omitted: how can the reports be ~~more~~ accepted by other scientists or not? This does not depend on the findings and conclusions in the reports, but on ~~method~~ understanding and ~~method~~ criticism and the ~~method~~ to suggest.
3. A thorough analysis of the findings and recommendations suggests that there is need for further study, not only in the technical and scientific problems but also in the ~~method~~ problem in this subject. In other words, there is a need to establish ~~method~~ problems, but first ~~new~~ problems have to be

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Losses incurred for producing a unit of output  
(in rupees)

	ML-1 Steel stainless steel tires (per t.)	ML-1 Steel pipes (per t.)	ML-2 Hindi tires (per t.)	ML-2 Ferro- alloys (per t.)
Total basic materials	10.00	9.00	10.00	10.00
Total chemicals and other auxiliary materials	1.00	1.00	1.00	1.00
Total fuel, electricity and lubricants	1.00	1.00	1.00	1.00
Total other materials (maintenance, repairs, packing) consumable stores	1.00	1.00	1.00	1.00
Total service used	6.00	4.00	4.00	5.00
Rent	3.00	2.00	2.00	2.00
Depreciation				
Total value of external inputs	35.65	32.81	32.81	34.74
Value added by manufacture	42.00	39.28	39.28	41.00
Total labour or employment	36.00	34.04	34.04	35.00
Accumulation	15.00	14.00	14.00	15.00

Source: Compiled from figures published by the National Council for Applied Economic Research.

APPENDIX - APPENDIX AND EVALUATION OF THE REPORTS

VII. EVALUATION OF THE SPECIFIC ASPECTS OF THE STUDIES

121. It is essential that the proposed development of production harmonize with national goals and policies and with the objectives of the designed plan. The recommendations of each feasibility study must also be in accord with the national goals and policy and with the plan targets and figures. It is not up to the United Nations experts to make this decision. This can only be done properly by the Government and experts. Invert else the United Nations experts may feel free to make a decision.

122. National goals and policies include the industrial and economic development needed to raise the national income and employ more people, with the emphasis on self-reliance. The proposed development of the industry, especially in regard to ferro-alloy, paper and pulp and aluminum, supports these policies and goals, but the contribution which can be made by implementing the reports' recommendations, must also be indicated, as well as how this contribution can help to give a push to the "take-off" policy. None of these projects offers the possibility of further development for a country. This can be proved by an analysis of quantity and quality.

123. The targets and objectives of the plan are a realization of a given policy and goals within a given time and circumstances. By comparing these targets and objectives, one recognizes that all the studied areas of industry are planned to develop much the same and that the proposed new production is completely contributing to attain that end.

125. The areas of industry studied are: Mineral and forest-based industries; resource-based industries which support the objectives of the plan to utilize better the available natural resources. The impact of the implementation of the proposed industrial development on the chances of all plan targets and objectives should be discussed, i.e. what consequences will result from the planned development. Some kind of "additional impact" which will help to foster and improve the very basis for planning the economic and social development is necessary.

Table 1

Technical coefficient comparison between India and Yugoslavia

Product structure	Internal labor	Importation of raw materials	Capital investment
Manufacture of cement products	a) 1.0 b) 1.0	1.0	1.0
Fabricated	a) 1.0 b) 1.0	1.0	1.0
Plates and vessels	a) 1.0 b) 1.0	1.0	1.0
Iron and steel - bars, rods, sheets, billets	a) 1.0 b) 1.0	1.0	1.0
Iron and steel -			
pig iron	a) 1.0 b) 1.0	1.0	1.0
steel (Mn), manganese	a) 1.0 b) 1.0	1.0	1.0
intermediate products			
rolled for structures (heavy)	a) 1.0 b) 1.0	1.0	1.0
Sanitaryware and whiteware, sheets, wash basins	a) 1.0 b) 1.0	1.0	1.0
Plywood	a) 1.0 b) 1.0	1.0	1.0
Manufacture of paper and paper-board	a) 1.0 b) 1.0	1.0	1.0
Rubber tires	a) 1.0 b) 1.0	1.0	1.0
Rayon	a) 1.0 b) 1.0	1.0	1.0
Cement	a) 1.0 b) 1.0	1.0	1.0
Internal combustion engines	a) 1.0 b) 1.0	1.0	1.0

Source: Manual for Investors, published in Yugoslavia

Note: a) India, 1961  
b) Yugoslavia, 1963

## VIII. RESUME OF COMMENTS AND THEIR ANALYSIS

### Specific reports

#### Sources of comments

126 Comments and suggestions were received from:

- (a) State of Madhya Pradesh government in the five first reports, in terms of short-term evaluation and suggestions for experiments. For the last two reports, extensive comments are given on a series regarding enhancement and rectification of errors and omissions.
- (b) Industry and Mineral, Chemical and Mining and appropriate Ministers, as well as Director General of Technical Development, with respect to the first five reports, indicating impossibilities for implementation of recommendations and giving some statement regarding the information in the reports as follow. The last two reports were discussed at the meetings attended by the above-mentioned. The ferro-alloy report was discussed in its preliminary state, and the aluminium report in its draft state.
- (c) Only one out of four requested institutes and two enterprises have given comments on the report (Fibre-board). The report on Ferro-alloy was commented on by the concerned enterprise. The Institute (NCIIR), the institutional basis for the project, has commented very briefly on four reports.
- (d) United Nations agencies and bodies (UNAFT) have commented on some of the reports in their preliminary states (outlines and drafts for pulp and paper, aluminium and fibre-board), and have commented indirectly in progress reports (ferro-alloy and fibre-board only), and have given comments in all final drafts.

#### Lack of comments

127 The absence of comments from organizations who were invited to participate in the studies, and also from enterprises who should have been involved in some way in these studies, is an important handicap in analysing the results of this endeavour. A characteristic feature of the comments is that, except for one from the State of Madhya Pradesh, they deal primarily with the recommendations on production feasibility and do not recognize much value in them. There

3/ The first five reports are foundry grade pig iron, pulp and paper prospects, aluminium industry, large structural steel fabrication plant, steel pipe operations

4/ The last two reports are ferro-alloy and fibre-board.

are few discussions about the potential consequences emerging from the suggestions, discussions and recommendations in the reports. The suggestions neither deal with the short-comings of organizational procedures of the project work (with respect to experts and counterparts), nor do they attempt to appraise the whole work of the project.

128. The comments from Madhya Pradesh State are more extensive and deal with all aspects of the reports, and especially critically appraise the organization and procedural factors most responsible for shortcomings of the reports.

#### Disagreements

129. Another characteristic feature of some comments is that there is no agreement between first comments offered and later ones. (e.g. comments of industries on aluminium given at the meeting on 22 January 1977 and then later at another meeting). The comments of the central authorities are basically negative, while the comments from the State recognize more value in the reports and provide clues for follow-up work - enhancement and implementation. (Comments from enterprises are similar).

#### Comments from the States (Madhya Pradesh)

130. The comments on the first five reports included:

- (a) Before offering specific comments in the case of the last two reports (steel structures and pipes), the reports have not been developed to a stage where they could form a basis for investment decisions. In a number of cases, while noting the various possibilities, the reports do not develop all of them to specific conclusion. There have also been undue delays in the receipt of the reports on the aluminium industry, large structural steel fabrication plant, steel pipe operations and the foundry grade pig iron plant.
- (b) In the case of the report of the aluminium industry the expert has dealt with a number of matters which were specifically excluded from the purview of this study.
- (c) There has been practically no association of the officials of the State Government in the preparation of these reports except for accompanying the United Nations experts who came for short visits to the State and providing of the initial data. The officials of the State Government were neither consulted regarding the availability of any additional data or while drafting the reports.

(a) It is felt that the lack of association can be to a large extent the reason for the unsatisfactory development of mining activities. It is recommended that a committee be appointed to the post of operations earlier decided. We would like to advise that the following point provided by the Secretary of State need to be considered further may be examined in the following Committee.

(b) The general aspects have already been brought to the attention of the United Nations Industry Survey Mission and also informally to the Office of the Advisory (Resources) Commission. The State Government would like to emphasize that these counter-measures are required. It would also be desirable that the specific recommendations in respect of individual imports like coal be soon implemented in supplementary legislation if required.

(c) Report on the Fertilizer-grade pig iron project

The United States expert has noted the occurrence of sulphur at Charkha, Oreg and Dilla-Billa. The possibilities of establishing pyrometallurgical plants on the Dwallar and Katni deposits have however not been developed at all. In fact in the case of Dwallar deposits the matter has been only discussed with reference to a dividend proposition by a private entrepreneur. At the present mineral level status of the deposits per se it has been done.

In the case of Katni deposits, a limited examination of the matter in the context of the Singhrauli Coal Complex has been attempted; the use of much superior Charcha Katkona shale in this connection has been completely overlooked.

In these circumstances, the development of the proposal for Dilla-Billa is examined as far as comparison with the other two alternatives is possible. Even in the case of Dilla-Billa only the electric process has been considered without any comparison with any other process. The electric process is mainly dependent on the establishment of a hydro-electric power station, on which no firm decision has been made so far. The report has thus not developed any single alternative fully.

(d) IV Report on pulp and paper prospects

"The expert has suggested that there is a good prospect for a corrugated paper mill using bagasse as raw material at Oreg. He had also noted that it is urgent to take steps to collect more information but it is regretted that he has neither indicated the extent to which necessary information is available at present nor the points in which additional information needs to be collected.

"The possibility of producing paper from mixed wood and mechanical pulp has not been specifically examined for regions other than Madhya Pradesh. Such a possibility is clearly viable. The expert has excluded the use of eucalyptus for production of paper pulp on the ground that it is difficult to earmark for the production of rayon-grade pulp. In view of the present position of the rayon-grade pulp industry in India, such an exclusion is not justified. Had these risks been taken, in view, some more possibilities could have emerged.

(h) III Report on the aluminium industry

"As observed, most of the work done by the expert is of no value since he has gone beyond the purview of the scope of his report."

(i) IV & V Report on steel pipe operations and large structural fabrication plant

No comments are offered except to observe that the delay in respect of these reports militate against their ready use for promotion of these industries."

131. The Co-ordinator discussed the reports and comments with the representatives of Madhya Pradesh. He drew attention to the fact that the reports on steel structural and pipes are on manufacturing and that is why they differ and are more reliable than the others. The comments on aluminium are not in accordance with the real value of the report. The report has developed the most concrete data and has presented more information than any other report. It was considered by the experts to be the best report. The reason why the expert went out "beyond the purview of the scope of his report" is to be answered by the counterpart and sponsor; the expert is not to blame. The comments from the State are, in general, more rigorous and strong, based on unrealistic expectations.

132. The comments on fibre-board are very extensive, with the main point being investigating the feasibility of putting up particle and insulation board. The other queries elaborate more the different points of the report to make it applicable and attractive to the potential entrepreneurs.

133. The comments on ferro-alloy are also an enlargement of some points in order to make the report applicable and to give more clues, for follow-up work (marketability of silico-manganese in India and abroad, data required for the close study of manganese ore, capital cost and foreign exchange portion for putting up silico-manganese and electrolytic manganese and so on)

Comments from Government Commissions and other Central Institutes

134. The main point of the report's comments are that most of the recommendations of the report can be implemented in the short term if the required resources are available, and that the recommendations pertaining to steel plants (mills and pipes) appear to exist. Their analysis points to the following in the General Report, which is, of course, in agreement with the experts' recommendations and observations: that there is no lack of manpower or the required industrial sites from a broader point of view; that there is no lack of supply "treated steel on demand"; and that there is no effective competition in economy, i.e., its purchasing power is quite limited. On the contrary, there is ample space for developing the production of paper, iron and steel, particle board, steel structures, and pipes, where there is least competition among them and the potentialities to export the end products.

135. Now, there is not other facilities existing; the question is as to how to materialize the recommendations and make use of other suggestions, findings and observations of the reports. The following process, which is still not fully organized, reveals trends of experience in Madhya Pradesh and Maharashtra, suggesting that there is ample space to continue with the efforts of development. Information assistance from the United Nations could be justified in this respect in order to discover ways and means to implement many of the possibilities mentioned in these present reports and in other research studies undertaken by Indian institutions and institutions all over the world.

Comments from Institutes and enterprises

136. The institutions and enterprises discus primarily the detailed figures and suggestions, and request more plant sites. The comments from the Bhadravati Steel Works indicated that the recommendations in the ferro-alloy report are not feasible owing to the setting up of new plants for ferro-alloy in Orissa and Andhra Pradesh, where reconstruction and modernisation of furnaces in Bhadravati for the production of ferr-chrome does not seem quite justifiable. This is a very good beginning for looking deeper into the problem. The recommendation in the report to start production with the existing capacities (where there is a free capacity) is right in principle from the point of view of economy, experience, technical skill available, and the possibility to train personnel for future plants. Is this not right from the actual point of view of prevailing facts that it has to be proved by thorough investigation and processing data by the experts?

## Comments on various findings, conclusions and recommendations

137. These comments are in general, positive, and are based on the concrete substance and the objectivity of the reports. They do not approach the subject from which are not related to the reports.

### IV. GENERAL EVALUATION

138. Besides all that has been said about the reports, it must be added, it is valuable that a fair, general evaluation of the feasibility, availability and importance of the reports is given.

139. The usefulness of the information of the reports can be seen in the preparatory and final stages of the reports. It is useful in the implementation of the recommendations. The first stage of the experiments, with their experience and fail-safe methods of evaluation, gives some idea of the availability of new enterprises, techniques and methods for given circumstances and conditions, in addition to the cost of investment. It is true that the inadequate assimilation of requirements and the potential contributors and recipient by limited the results of effectiveness new facts discovered in the course of the work, about new enterprises and their conditions or problems are very important and valuable results of the studies. The comments of the competent and concerned departments and authorities prove this. As a result of the work, knowledge and expertise was increased, and the Indian scene with respect to feasibility studies is richer and more diversified and the capacity to research and analyze, has without doubt, expanded itself in all directions.

140. The possibility of utilizing the findings and recommendations is certain after it has been proved that they are in accordance with the needs and place of the country. The question arises when one attempts to materialize the recommendation by investing the new capacity. Theoretically and practically, the findings and recommendations are applicable and usable in this or that way. The findings and recommendations are for the most part, technically and economically sound, taking into account, of course, the necessary corrections and adjustments made by the user. Even if they are not so, they still have some positive effect in that they stimulated a deeper and more thorough study of the problems. This is another side of "possibility" of the findings and

14. **What is the best way to handle a difficult customer?**  
The best way to handle a difficult customer is to remain calm and professional. Listen carefully to the customer's concerns and try to understand their perspective. If possible, offer a solution or compromise that addresses their needs. It's important to maintain a positive attitude and avoid becoming defensive or argumentative.

15. **How can you prevent conflicts between employees?**  
Preventing conflicts between employees requires effective communication and conflict resolution skills. Encourage open and honest communication among employees, and provide training on how to handle disagreements constructively. Establish clear policies and procedures to ensure everyone follows the same standards. Promote a culture of respect and appreciation for each other's contributions.

16. **What are some common mistakes made by new managers?**  
Some common mistakes made by new managers include micromanaging their team, failing to delegate responsibilities effectively, and not providing clear guidance or feedback. They may also struggle with setting boundaries, managing conflicts, and maintaining a positive work environment. To overcome these challenges, it's important for new managers to seek mentorship, attend professional development training, and practice self-awareness.



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The reports should be based from the point of view of the most up-to-date and representative and both should appear on the strengths and weaknesses for the given categories. I suggest no reporting regarding the areas and there is no infringement on freedom as well as the improvement in operation should be reflected in both the and both should bring the financiality studies. It is preferable to suggest that some type of instruction would "Financial reports" should be developed.

10. The following table shows the number of hours worked by each employee.

the first time, and the first time I have ever seen it. It is a very small plant, about 10 cm. tall, with a single stem, which is covered with a dense, silvery-grey hair. The leaves are opposite, entire, and pointed. The flowers are small, yellow, and arranged in a terminal cyme inflorescence. The fruit is a small, round, brown capsule.

the following recommendations to the Director of the Bureau of Technical Services, FBI, Washington, D.C., for consideration and implementation either as a long-term or short-term performance standard or by agreement with the WFO Office. Representative recommendations are as follows: (for more detailed information, see the accompanying memorandum dated January 19, 1968) (1) The Director of the Bureau of Technical Services, FBI, Washington, D.C., shall help to establish a WFO Office, which will be responsible for the development and maintenance of a system of records for all information concerning the WFO and its activities. (2) The Director of the Bureau of Technical Services, FBI, Washington, D.C., shall help to establish a WFO Office, which will be responsible for the development and maintenance of a system of records for all information concerning the WFO and its activities.

ANSWER

SUMMARY OF REPORTS AND SUPPLEMENTS

Answers

- A. Aluminium
- B. Foundry pig iron
- C. Ferro-alloys
- D. Pulp and paper
- E. Fibre-board
- F. Steel pipes
- G. Heavy steel structures

— 1 MAY 1988

1. The first step in the process of creating a new product is to identify the problem or opportunity that the product will address.

The following table gives the results of the experiments made at the University of Michigan, and shows the effect of the different methods of treatment.

The first stage of the production of electric power, viz. the generation of electricity, is best suited to the solution of the hydroelectric problem. Hydroelectric power is independent of the time of day, different seasons, November, 1940. It is also a state where water, fuel and electric power are available in abundance. The fact is that transient water or other eliminated rainfall is the primary and important resource and the elements in electric power stations, except for the initial investment,

The following either for the supply of quality raw materials and fuel or its proximity are usually noted. Some salient points for the suitability of particular locations for putting up an **INDIUM** industry are given below:

first investment in plant and equipments. The unit cost of the largest two sizes of alumina plants are only 44.0 per cent and 44.5 per cent of that of the smallst plants and in the case of small ones, it is about 70 per cent. Thus the very first stage in the efforts to reduce costs of production should be to aim at large economic capacities. This is particularly true of the first stage in the alumina industry, viz. the production of alumina.

The cost of power is the largest item of production costs. It is difficult to estimate the cost of power required for the different types of processes. The cost of power required for the electrolytic reduction of alumina is about 10 per cent of the total cost of production. The cost of power required for the reduction of alumina by the Hall-Heroult process is about 15 per cent of the total cost of production. Thus, among the various methods of production, the cost of power required for the electrolytic reduction of alumina is the lowest.

Secondly, the cost of labour is another important factor. The cost of labour is directly related to the type of the plant. In the case of the electrolytic deposition plant, the cost of labour is mainly determined by the nature of the plant in which the labour is employed. The highest proportion of labour is employed in the electrolytic plants where the working conditions are not favourable and the labour is less skilled. The cost of labour is also dependent on the wage rates of the workers. The cost of labour is further affected by the price level of the labour. The cost of labour is the most variable component of production costs and it is difficult to evaluate.

- (d) Cost of fuel and steam. The cost of electricity will be oriented to the cost of coal or natural gas, used for the production of steam and heat for alumina calcination.
- (e) Alkalines and other reagents. The cost of two different prices and profitability of the same type of kinds of clays to be closely linked with the quality of the bauxite. The loss of alkaline in the by-product of aluminium production can be compensated by the use of either (i) sodium hydroxide 30 per cent NaOH, (ii) solid caustic soda 37 per cent NaOH or (iii) chloropolymer caustic soda 30 per cent solution NaOH. However, the use of these alkalines depends on their prices.
- (f) Transport costs. It is important to realize the effect of transport costs in aluminium production. For the production of one ton of aluminium, ten tons of material movement is involved and 40 per cent of the gross freight of the vertical production cycle is due to the transportation of bauxite, alumina and fuel. Thus, the ideal location of an aluminium industry is in the vicinity of good bauxite and fuel resources.

#### Existing aluminium industry in India

##### Bauxite mining

5. The industry uses high quality bauxite ore which exceeds the average quality of the local bauxite reserves in India. There is a tendency among most companies to adopt selective mining in their leased areas. This is not conducive to long-term economics of the industry. The price of bauxite at the alumina plants of the Indian producers varies from Rs. 20 to 23 per ton, i.e., approximately

firm time is lower than the world market price, for most of the secondary industry (Pt. III, Chapter 10, 1.3.0).

#### Alumina production

7. All existing alumina units in India are considered as uneconomic as their capacities are below 50,000 tons per year. The production cost of alumina varies between Rs. 1,800 to 2,800 per ton, i.e., about twice the price of alumina in the world market. The reasons for the discrepancy between local production costs and world market prices may be:

- (a) high unit capital equipment;
- (b) economic inefficiency;
- (c) high price of electricity.

The unit production cost in the production of alumina in India amounts to Rs. 1,800 to 2,800 per ton compared to other countries of the world. The price of imported alumina Rs. 1,100 per ton is against Rs. 200 to 400 on the world market. For the same quantity of the basic oxide used in India, the consumption of oxides, carbon, fuel, alkalies, etc. are high compared to alumina plants elsewhere. The existing alumina plants lack automatic control systems resulting invariances in the different stages of production. The introduction of automatic control systems ensuring full continuity of the process, is economically feasible only for plants with larger capacities, i.e., 20,000 tons per annum and above. Although the available data are not adequate for drawing final conclusions, there are indications of under-utilization of existing capacities.

#### Aluminium smelters

7. The capacities of the five smelters are rated at between 7,500 to 20,000 tons per annum. Unlike the case of alumina plants, the smelters at Renukot and Hirakud may be considered to have near-economic capacities. However, the price of aluminium from these smelters varies between Rs. 3,000 to 5,000 per ton, which is twice the price of aluminium in the world market. An analysis of the different components shows that the cost of alumina constitutes about 25 to 30 per cent of the final price of primary aluminium. Electric energy at current high tariffs (by world standards) accounts for another 15 to 20 per cent. (Pt. III, Chapter 10, 1.3.0)

### Electric power tariffs

9. The Indian Government supplies electric power at different tariffs. The price ranges from Rs. 1.00 to 1.50 per unit. The rates are not uniform, the result of regional differences in electric power generation. The rates are determined by the State Electricity Boards and are usually lower than the real costs of generation. (Pt.III, Chapter 1, 1.1.1)

### Manufacture of aluminium

10. There are at the present time units with a combined capacity of about 1,000 tons, with individual capacities ranging from 20 to 1,000 tons per annum. Because of the fact that the price of the primary metal is relatively high in India, the price of the produced goods are also much above world prices. Added to uneconomic capacities of the existing units, there is also lack of specialization which is necessary to cut costs of production. Rolling mills with capacities of 10,000 to 50,000 tons or even 100,000 tons per annum and extrusion mills of 5,000 to 10,000 tons per annum are quite common today. (Pt.III, Chapter 10, 1.4.)

### Domestic market

10. In line with the world trend, the consumption of aluminium is bound to increase in India. The finishing industry must be technically and economically able, however, to undertake large-scale production of aluminium and to introduce new production assortments. At present the electrical conductor and domestic utensils industries account for 58 per cent of the total consumption of aluminium products in India. The share of the building and transportation industries is only 17 per cent, compared with that of nearly 38 to 47 per cent in industrialised countries. The manufacture of aluminium goods with higher finishing stages has still to be developed in India but the main obstacle is the high price of the basic metal. Efforts to reduce cost of production of the basic metal will not only stimulate the consumption of the finished goods but will also facilitate changes in the consumption structure. (Pt.III, Chapter 10, 1.5.0 and Pt.I, Chapter 3, 2.0.0)

1. 1. 1  
Alumina  
Bauxite

### 1. 1. 1. 1. Raw Materials of the Aluminium Industry in India

1. 1. 1. 1. 1. An analysis of the raw material requirements indicates that existing resources are sufficient to meet the needs of the aluminium industry in India, and on the basis of the present development of the industry, there is no need to import any foreign raw materials. The industry has definite requirements for alumina, bauxite, coke, coal, limestone, etc., for the production of the existing and future capacity. The availability of these raw materials is considered to be a considerable factor in the cost of production of aluminium.

#### Requirements of Raw Materials

- (i) The potential capacity of the aluminium industry in India is estimated at approximately 1,000,000 tons per annum;
- (ii) Power requirements for a plant of 300,000 tons per annum, provided the cost of electric current can be kept within the range of world market prices;
- (iii) In the case of potential bauxite resources, India can produce 10,000 tons of alumina per annum (which corresponds to the planned output of 300,000 tons of aluminium per annum), if both low-middle-grade bauxites only are used;
- (iv) As far as providing fuel resources for the aluminium industry, there are excellent facilities in India for supplying coal of low calorific value which are also close to bauxite mining. Fine coal can also be supplied after assortments;
- (v) The supply of other raw materials (such as alkalis, potassium, potash, cryolite and fluorides) should not present much difficulty, if adequate investments are made for these supplies.

#### Regional distribution of resources

- 13. An analysis of the raw material and power resources in India indicates that economic capacity units can be developed in the States of Madhya Pradesh, Mysore, Maharashtra and Gujarat. Considered in the over-all sense, India can have two distinct production centres for the basic aluminium industry: one in the State of Madhya Pradesh in the eastern part of India and another in the States of Gujarat, Maharashtra and Mysore, in the western part of India. Aluminium fabricating units could be developed regionally in straight line between the aluminium smelter and centres of consumption, preferably leaning more towards the centres of consumption.

14. If the level of aluminium production is 170,000 tons per annum, then this constitutes the first stage of realization, the second stage will be one necessary when the country's production will be raised to 213,000 tons per annum. For the first phase of realization, several variable options are given below:

- (a) Expansion of existing capacities from 17,000 to 147,000 tons per annum requiring a total investment of Rs. 530 to 1,34 million. This will not, however, be adequate to cover over-all domestic requirements, 47,000 tons of which will still have to be imported.
- (b) Maintaining the present level of production (66,000 tons) in the existing units and the construction of a single new alumina plant with a capacity of 100,000 tons per annum and a single aluminium smelter of 14,000 tons capacity per annum in Madhya Pradesh. This will ensure a total availability of 170,000 tons of metal sufficient for the domestic market in 1970/71. The cost involved will be between Rs. 1,192 to 1,44 million. However, such an arrangement would disregard the co-ordination of the intermediate production units in the eastern and western parts of the country.
- (c) The third solution is practically the same as (b) with the exception of expanding the Andhra unit capacity to 50,000 tons of alumina and 25,000 tons of aluminium. The total availability of metal will thus be increased to 194,000 tons and the over-all investment will come to Rs. 1,373 to 1,73 million.
- (d) Expansion of the existing units and the construction of new units in the eastern region of the country and conservation of the western region units. In this case the metal availability will be increased to 198,000 tons (178,000 tons from the eastern region and 21,000 tons from the existing units in the western region) with a total investment of Rs. 1,374 to 2,078 million. The deficiency will be the same as for solutions (a) to (c), in addition there will be difficulties in export arrangements from aluminium and its final products.
- (e) Construction of new units in the western region and conservation of units in the eastern regions. This variable will result in metal availability of 183,000 tons and a total investment of Rs. 1,118 to 1,539 million. This solution does not appear to suffer from any serious deficiency, as the domestic demand will be met and the co-ordination intermediate production seems to be guaranteed.
- (f) Construction of new units in the western region and the expansion of the existing alumina plant in Muri (eastern region) from 66,000 to 100,000 tons per annum and of the smelter in Orissa from 20,000 to 50,000 tons per annum with a total investment of Rs. 1,244 to 1,672 million and a metal availability of 213,000 tons. This alternative is considered

India 1971

Alumina

Furnace

The first stage of the alumina plant is the floatation process which is carried out in the presence of a large amount of lime. This is followed by calcination of the alumina in a furnace. Further, the alumina is converted into the oxide by the addition of lime. Finally, the alumina is converted into the metal.

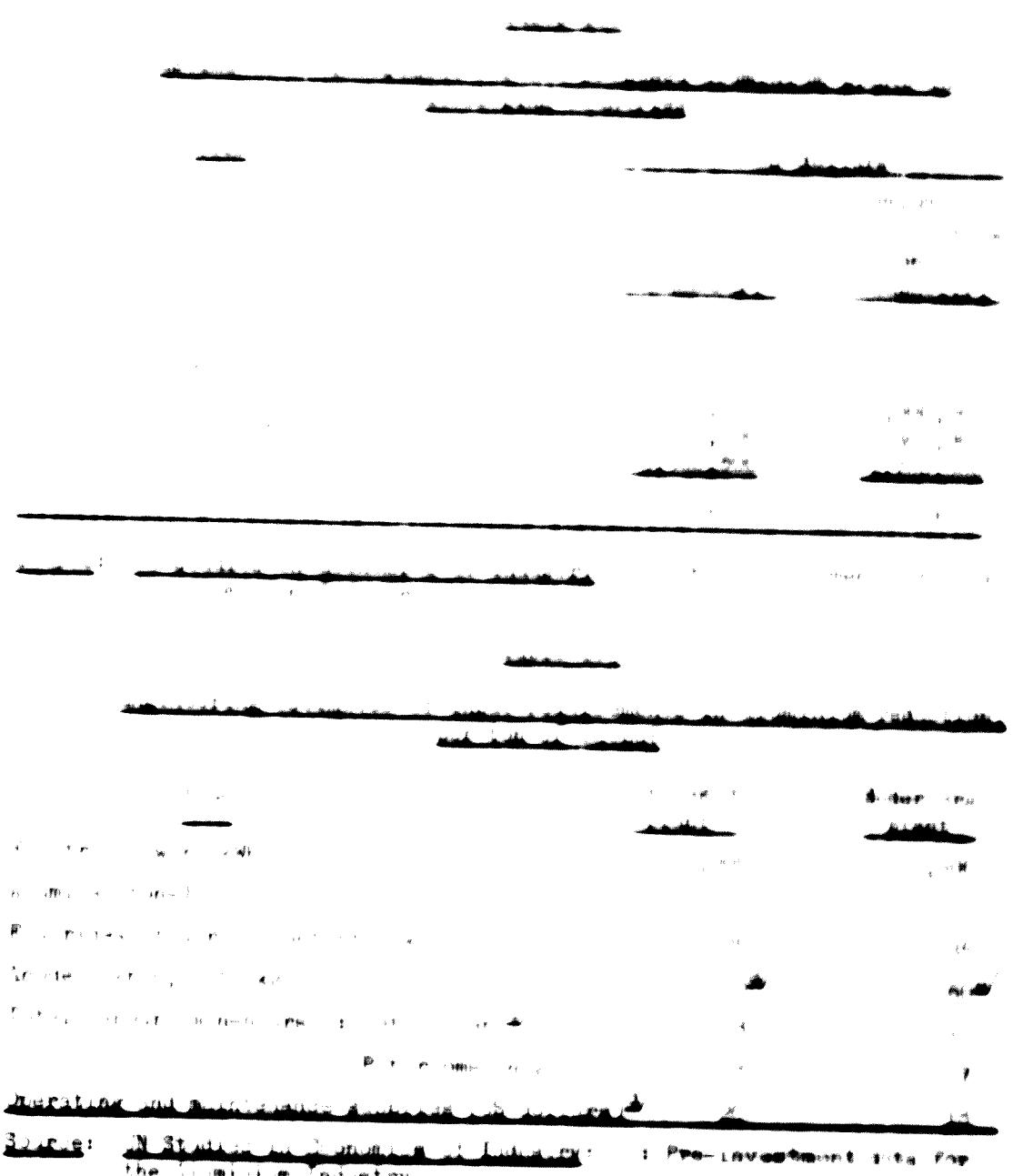
#### Products from the alumina plant

The products of the alumina plant are alumina and aluminium. The alumina is used in the manufacture of ceramic materials and the aluminium is used in the manufacture of aluminium and aluminium plants with an output of 100,000 tons of primary aluminium has been made for particular micro-locations, both in Madhya Pradesh and Bihar. (Pt.III, Section 1). It is also used in the production of refractory materials for the manufacture of primary aluminium plants. The alumina is slightly higher than the world average.

Name of alumina plants	Alumina Without Gypsum		Alumina With Gypsum		Calcined Alumina	
	Alumina Without Gypsum	Alumina With Gypsum	Alumina Without Gypsum	Alumina With Gypsum	Alumina Without Gypsum	Alumina With Gypsum
Mandvi (Gujarat)	9,175,0	-	-	-	-	-
Ratnagiri (Maharashtra)	4,17,0	-	-	-	-	-
Karwar (Karnataka)	4,17,0	-	-	-	-	-
Bhiman (Karnataka)	467,0	-	-	-	-	-
Karha (M.P.)	467,0	-	-	-	-	-
Panira (M.P.)	164,0	-	-	-	-	-
Karwar (M.P.)	197,0	-	-	-	-	-

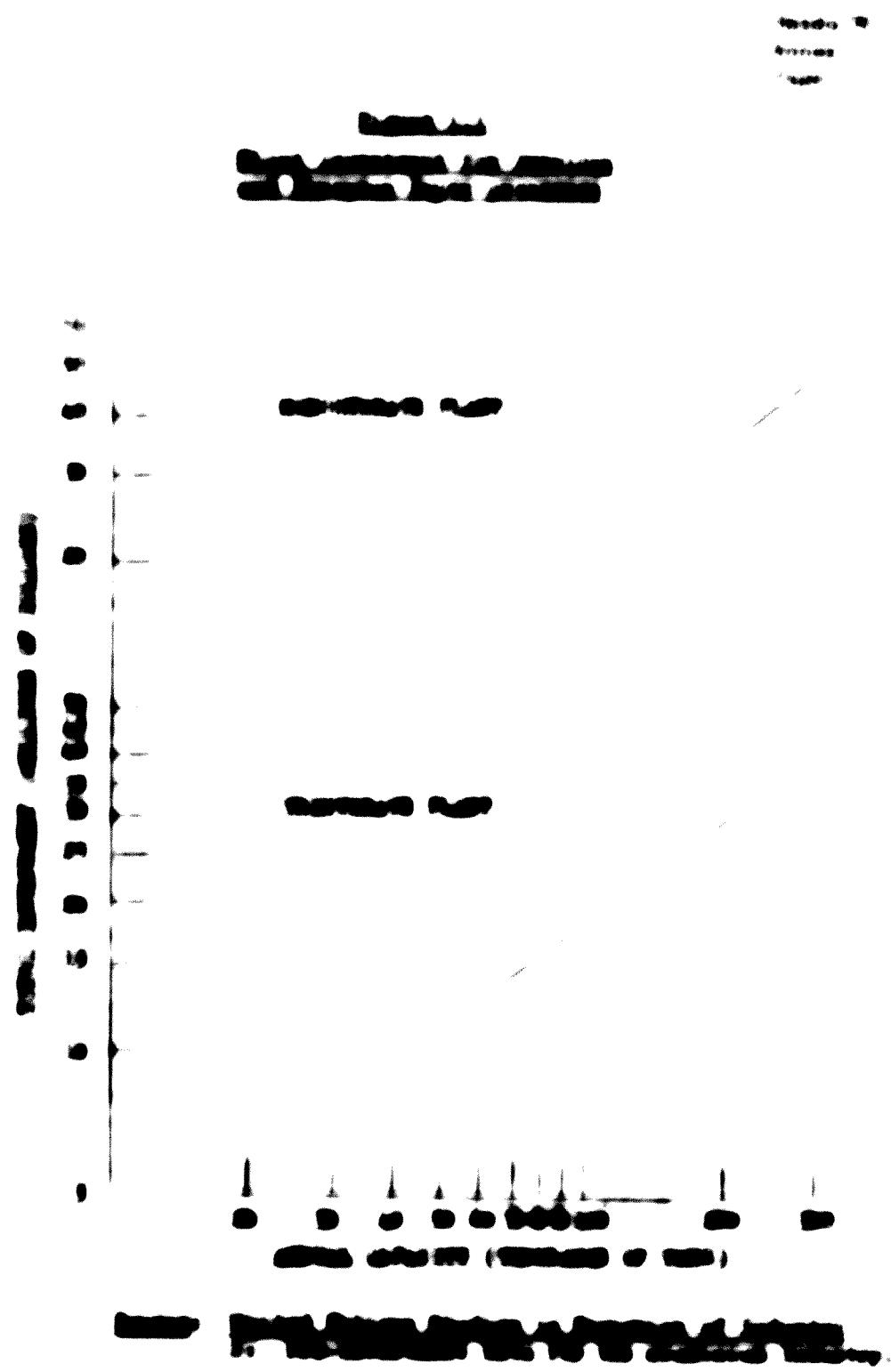
<sup>1/</sup> Supplied with alumina by the relevant alumina plants.

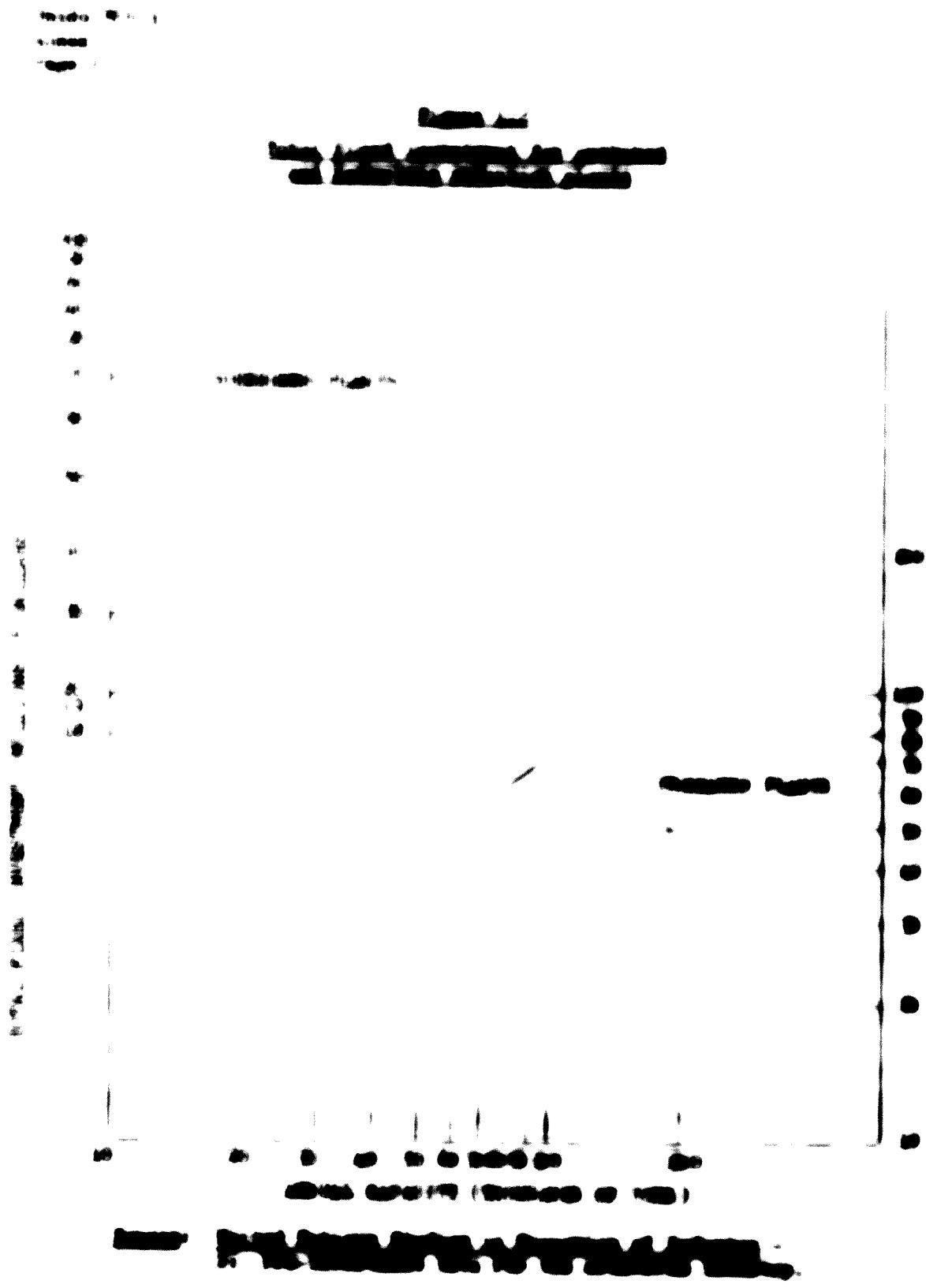
Note: The figures about selling price for the micro-locations on the western coast (Mandvi, Ratnagiri and Karwar) are based on the existing sea rates which are much higher than in the world proportion. On the other hand, all continental micro-locations are based in the existing railway rates which are less than the world proportion. It means that micro-locations on sea transport can be in the future more rentable than other ones.



Source: N.S. Studies on Seismicity and Volcanicity - I Pre-Investment study for the Tumultum Industry

- ✓ Prebaxed carbon nodes
- ✓ Seismic nodes
- ✓ Inclining system (Inclining instrument, GPS, V.L.S.M. and Inductor, above)
- ✓ Inclining methane measurement





The first part of the paper deals with the conditions in the present-day study area as regards the hydrology, the vegetation and the presence of large-scale human impacts. The latter two components are presented by the author of this paper and the former by the author of the paper on the impact of human activity on the water balance.

and the other two were found to be identical with the first. The results of the experiments are given in Table I.

Another way to produce better results is to increase the number of staff members. In our study, we found that the average product is higher over the other two. The average product in Figure 1 has been shown to have variance 0.001 which would apply to various conditions where there may be certain prior to one side or another. The aspect of such variance is good source for the development of strategy. This can also be used when trying to make better plan supply, as the change of using related to each other rate of consumption compared with their future and also some of inflation rate of price. This might be the reason why there is no any form of one-side effect of a ready effort to expand market can be expected for a high-grade of production.

9. ~~Indicate as another factor that the location is recommended in  
connection to both as there are no other advantages given the appropriate  
location as the one depicted as probably the student is looking. There are  
several reasons of this situation are, one in importance and an alternative  
location for placement.~~

11. ~~There is often damage to a large part of the National  
Forest. A large area of the forest will be directly or  
indirectly affected by the cutting of up to 5 million  
trees. This will be fully compensated monetary, so~~

The following statement is based upon personal experience. The  
various development corporations are also making out full and detailed  
statements of the cost of building houses in the various parts of the country. The  
cost of building a house in the country, including all expenses of construction, has  
been estimated at \$10,000. This estimate, however, is not reliable in very large  
numbers. The figures obtained by these organizations are at reasonable distances  
from the coast.

It is anticipated that the value of the products will be exported and about one-half of the production will be sold at a considerable marketing advantage over

THE PROPOSED TRADE AGREEMENT WOULD NOT BE IN CONFLICT WITH THE NORTH AMERICAN FREE TRADE AGREEMENT OR THE GATT. ANOTHER FORM OF TRADING RELATIONSHIP IS EN视觉化INGAGED, INCLUDING ON THE ONE HAND, THE PROPOSED TRADE AGREEMENT COULD NATURALLY CONTRIBUTE TO THE ECONOMIC DISTRIBUTION OF PRODUCTS AND THE IMPORT-EXPORT OF OTHER GOODS AND SERVICES.

The first of the new ships will be a standard vessel following the freight  
rate, the exact tonnage being proposed, of the latest modern design, the  
capacity being 10,000 tons per ship.

For example, if the supplementary sample coke becomes available at a higher rate than the rest of the non-existing friends, coke-coke might be considered as the limiting factor and be low. In the meantime, calculations are based on the original coke (steel) 80%.

As an additional risk in a disease-free country, it is recommended that an expert opinion be invited on the possibility of local charcoal production for these treated fuel requirements.

Regarding electric power, it is assumed that before 1975/76, a large hydro-electric station will be operating based on the Induswati river or its tributaries in south Rangoon. From the statement as per, it is desirable to achieve the full economic development of Rangoon. The price should not exceed Rs. 0.07 per kw, but no. 0.05 has been assumed for safety.

28. In the dealing with the coke preparation, the advantages of coking plants have been clearly demonstrated but it is recommended that large-scale production is essential for low operating costs of a petrochemical plant. It is anticipated that the power consumption for the coke ovens furnace should not exceed 2000 kw per ton of coke.

14. With very little information available, the following are tentatively recommended for private owners:

- (a) Implement a maximum capacity limitation system.
- (b) Let the market determine the price of steel and iron.

15. Regarding the public sector, it is recommended that the following be put into effect:  
a) Implement a maximum capacity limitation system.  
b) Let the market determine the price of steel and iron.

c) To prevent the production of steel and iron by foreign-owned plants (at least one per province), which would compete with the domestic economy in power consumption, it is recommended that the following be implemented. The National Mineral Development Corporation should be given the right to implement a per capita limit on their establishment of new plants. The following figures are quoted from the 1967 Economic Survey of the Philippines concerning the performance of imported iron and steel mills:

16. It is recommended that the following be done:  
a) The capacity of each plant should not be less than 50,000 metric tons per annum. The total capacity of all plants should not exceed 1,000,000 metric tons per annum.

17. The present capacity of the public sector in the production of iron and steel plants and steel, especially in the Fourth Plan, and current export plans, is far below the minimum requirements of supply firms. These must be increased.

18. In view of the fact that the projected increase in capacity should also in the Fifth Plan, be increased, it is recommended that consideration be given to the further expansion of Mindanao by the construction of new foundries and blast furnaces for the special production of ferro-alloys.

19. The project for the construction of a plant at Davao is naturally of great interest to Davao and the entire Mindanao region. The possibilities, however, apart from the steel policy, have the conceivable scope in that area for economic production of foundry iron, based on high-grade ore deposit and polotetting. This would take place in connection with an expanding development of the iron export trade through indirect sales.

20. Thus, with the next major production provided for and to the light of the above situation, it is pointed out that it is unnecessary at this stage to submit any detailed project for review.

SECRET

SECRET

U.S. STEEL EXPORTS  
U.S. STEEL EXPORTS - TRENDS AND PROBLEMS

1. U.S. STEEL EXPORTS - TRENDS AND PROBLEMS

2. U.S. STEEL EXPORTS

3. U.S. STEEL EXPORTS

4. U.S. STEEL EXPORTS

5. U.S. STEEL EXPORTS

6. U.S. STEEL EXPORTS

7. U.S. STEEL EXPORTS

1. U.S. STEEL EXPORTS - TRENDS AND PROBLEMS  
The following is a brief summary of the major trends in the steel industry during the past year. The report is divided into two parts: one dealing with the export market and the other dealing with the domestic market.

1.1. DOMESTIC MARKET  
The domestic market has shown significant growth in the last few years, particularly in the last two years. There has been a steady increase in the demand for steel products, particularly in the construction industry, which has been driven by the need for infrastructure development. This has led to a significant increase in the demand for steel products, particularly in the construction industry, which has been driven by the need for infrastructure development. This has led to a significant increase in the demand for steel products, particularly in the construction industry, which has been driven by the need for infrastructure development.

1.2. EXPORT MARKET  
The export market has also shown significant growth in the last few years, particularly in the last two years. The major markets for U.S. steel exports are Canada, Mexico, and Japan. The major markets for U.S. steel exports are Canada, Mexico, and Japan.

U.S. STEEL EXPORTS - TRENDS AND PROBLEMS

Exports for automotive industry - including exports	100,000
Steel products	1,000,000
Electrical goods for steel plants	100,000
Machinery and equipment requirements	100,000
Pipes and fittings	100,000
Barley equipment	100,000
Total	1,000,000

U.S. STEEL EXPORTS - TRENDS AND PROBLEMS

Plus 1000 requirements

U.S. STEEL EXPORTS - TRENDS AND PROBLEMS

## Industrial Sector

The industrial sector is the largest source of sulfur dioxide emissions in the United States. The major sources are electric power generation, steel production, and chemical manufacturing.

## Industrial Sector

A recent study by the Environmental Protection Agency (EPA) found that the industrial sector is responsible for about 40% of all sulfur dioxide emissions in the United States.

The industrial sector is also a major source of the fourth largest air pollutant, ozone. Ozone is formed by the reaction of sunlight with volatile organic compounds.

Ozone is a strong oxidant and can cause respiratory problems.

The industrial sector is also a major source of the second largest air pollutant, particulate matter. Particulate matter is composed of tiny, solid or liquid particles suspended in the air. It is a major health hazard and can cause respiratory problems, heart disease, and other health problems.

## Industrial Sector

The industrial sector is also a major source of greenhouse gases. Greenhouse gases are gases that trap heat in the atmosphere and contribute to global warming. The major greenhouse gases are carbon dioxide, methane, nitrous oxide, and fluorinated gases.

The industrial sector is also a major source of air pollutants such as sulfur dioxide, nitrogen oxides, and particulate matter. These pollutants can contribute to acid rain, smog, and other health problems.

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Date: 20.1.1

Annexure

10/10/68

45. There may be a future for the production of low-temperature coke from the non-coking coals such as are found in the Singareni complex (Andhra Pradesh), but the Dhanbad Fuel Research Institute found the quality quite unsuitable for pig iron production. Although the expert does not think the low-shaft furnace to be an economic unit, additional data to be received from the National Metallurgical Laboratories in Jamshedpur may open new prospects.

46. For low cost production, indigenous reports will demonstrate that large units are necessary with special regard to the highest quality of coke. The large steel plants will have developed special foundries whilst large engineering works require the latest cupola design and practice.

C. FERRO-ALLOYS

SUMMARY OF THE REPORT ON THE PROJECT STUDIES FOR  
FERRO-ALLOY INDUSTRIES IN MADHYA PRADESH AND MYSORE  
(Dr. Harry Willmers)

Mysore State

47. Mysore State has, next to Orissa, the largest chrome ore deposits in India and very large deposits of other minerals, a well-established ferro-alloy production (ferro-silicon), a large production of alloyed steel under rapid expansion (Bhadroovati) and large hydro-electric power resources at most competitive prices. Thus, all the pre-requisites exist for a rapid large-scale development of the electro-metallurgical industries in the State.

48. Statistical data show that quartz and limestone of sufficient quality are available in Mysore State. The chrome ore is quite suitable for making high-carbon ferro-chrome, but the suitability for silicon-chrome and consequently for low carbon ferro-chrome has not yet been proven in practice and has to be ascertained by preliminary smelting tests. The coke that is intended gradually to replace the expensive charcoal for the production of silicon-chrome and high-carbon ferro-chrome should also be tested in practice. These tests can be done in Bhadroovati after suitable modifications of their small 1500 KVA furnace.

49. In Mysore State, production should be planned for the over-all Indian demand of high-carbon ferro-chrome of quality, as no producer is yet equipped for the same. It cannot be recommended to considerably increase the large capacity of low-carbon ferro-chrome now under erection in other parts of India but it would be impractical and unwise not to plan for production facilities in Mysore State for the low-carbon ferro-chrome at the same time when arrangements are made for the other chromium alloys. Consequently, Mysore State also plans to cover the Mysore Iron and Steel Ltd.'s consumption of silicon-chrome and low-carbon ferro-chrome plus some extra capacity for the demand of southern region. The chromium production in Mysore State for a total production of 551,000 tons alloy steel which is the estimated requirement for 1975/76 is calculated to be 6,900 tons.

50. Among the two alternatives of (a) construction of an entirely new separate smelting plant, and (b) production to be arranged in combination with already existing smelting units, the latter is suggested because a separate new plant

would involve high power price and high overhead costs. A combination with an already producing smelting unit, sufficiently large to enable both low power price and low overheads, would be a better way.

51. The existing furnaces at Bhadravati after some modifications, can be used for such a combined smelting plant, i.e. the production of chromium alloys. Furtheron, the power consumption at Bhadravati is already well above the prescribed limit of 15,000 kWh.

52. After a few changes in their production or structure, the existing multi 1,500 kVA furnaces could be used for smelting tests of silicon-chrome and the production of high-carbon ferro-chrome of quality. New transformers may increase the smelting capacity up to 1,000 or 7,000 tons high-carbon ferro-chrome a year.

53. The existing 1,000 VA ferro-silicon furnace could, after modifications, produce silicon-chrome provided preliminary smelting tests are favourable. Part of this silicon-chrome can be desilicconised to low-carbon ferro-chrome.

54. For technical collaboration, Tysoe Iron and Steel Ltd. are in contact with Metallurgi-Consult in Sweden who have supplied the complete know-how for the Orissa's ferro-chrome plant.

55. If a co-operation between the Tysoe Iron and Steel Ltd. and the Electro-Metallurgical Works in Dandeli can be arrived at and the production capacity of their existing refining furnace comes up to expectations, an annual production of about 4,000 tons low-carbon ferro-chrome may be possible within a short time.

56. These quantities would not only cover India's immediate demand for chromium alloys but also represent a surplus capacity for the output of silicon-chrome thus enabling a profitable commercial production during the time-lag of about two years until Orissa's plant starts production.

57. The total investment costs for the necessary modifications has been estimated at about Rs. 5 million, out of which the equivalent of Rs. 2 to 2.5 million will be needed in foreign currency. The modifications include the modernisation of the rather old furnaces (built in 1941 and 1950). The first smelting tests should be possible already some months after the technical details have been clarified.

58. At present two units, the Orissa Industrial Development Corporation and the Ferro-Alloy Corporation at Baripada, which have been licensed to produce low-carbon ferro-chrome, are not likely to start production of chromium ferro-alloys

until 1970. The requirement of low-carbon ferro-chrome, during the transition period 1967 to 1970/71, can be met either by way of imports or by developing capacity by utilising existing equipment and facilities. In view of the present foreign exchange position, it would be a heavy strain on economy to import low-ferro-chrome to meet the demand of the alloy steel plants which are coming up fast. Ferro-chrome production at Bhadravati has to be started as soon as its operation is established with the Electro-Metallurgical works at Dandeli. This, no doubt, would require some balancing equipment, incurring the investment of not more than a few million rupees. Most of this equipment may be obtained from indigenous sources. Only the problem of initial technical know-how remains to be solved, which can be arranged if a firm decision is taken by the Government of India. Besides meeting the immediate demand for low-carbon ferro-chrome, this project also offers an excellent opportunity of obtaining considerable training and skill in electro-metallurgy, which is a highly specialised field. This training would at a later date be very useful to those plants which are in the stage of coming up.

#### Madhya Pradesh

59. With regard to manganese and silicon-alloys, conditions are very favourable in Madhya Pradesh. The manganese ore in Raigarh is the richest in India, high in manganese and phosphorous content ranging from very low to very high. Quartz and limestone of high purity are also available. As regards iron, Madhya Pradesh has the possibility of producing from iron-orebearing sand in the Surguja District a better and more economic coke (char) than the Indian ferro-alloy producers yet have had available. For particular alloys, while the rather high ash content may be detrimental, it should be possible to arrange for a supplementary supply of charcoal within the State. Geographically too, Madhya Pradesh is ideally situated with regard to the main ferro-alloy consumers.

60. As far as the suitable types of ferro-alloys, the least susceptible alloy to electrolytic manganese and silicon manganese is also well-planned. In India electrolytic manganese is at present not produced on a commercial scale and silicon-manganese only in small quantities of inferior quality. These two alloys should offer interesting production possibilities in Madhya Pradesh.

61. About 45 per cent of all the ore tonnage exported from Madhya Pradesh has a higher than 45 per cent Fe content, whereas the corresponding figures for Uppal and Guntur are about 35 and 30 per cent Fe, respectively. The higher manganese

— 1 —

1

4

content in the topsoil, there is a definite advantage. There is the northern part of the district has a phosphorus content up to 1.5 percent. In order to get good quality areas required for intensive cultivation, new mines may have to be opened up or new agricultural areas supply the requirement. Thus, there should be no difficulties in the supply of raw materials. At the present time, there should be 4000 tons for the application, for instance, 1000 tons per year with 4 percent P<sub>2</sub>O<sub>5</sub> and a maximum of 1.5 percent P<sub>2</sub>O<sub>5</sub>.

In **Västertorps** where underground mining is done, the present acid dump may constitute about 10 tons titan every year. If tons of ore are delivered, **Baerwald** mine in **Switzerland** has a similar ore as **Västertorp** (up to 10 percent Ti) in the **St. Gotthard** area and the deposits are much further; though ore with a high phosphorus content is not to be used for metallurgical purposes it can be exploited for production of electrolytic manganese. The **Tekniska Institutet of Technology**, Sweden, has produced samples of pure electrolytic manganese from Indian manganese ore with phosphorus contents as high as 1.1 per cent. It is suggested that preliminary calculations and investigations should be started to utilize waste and otherwise valueless manganese ore. A proper solution may be decisive for realization of the projects.

3. Suitable location of the plant can be found along the railway line Nagpur-Daikpur near the transmission line Bhilai-Bodhgaon at a place where water supply can be guaranteed and the transport cost for raw materials and products are favourable. Favourable conditions could also be obtained at some point along the railway line Rajpur-Bilaspur, where water supply is sufficient. Bilaspur and Kangri, 16 miles from Bilaspur, have also been mentioned as possible plant locations.

54. Regarding the size of reduction furnace, it is desirable to choose such an equipment and design that ensures the economic production of not only silicon-manganese but also of ferro-silicon and standard ferro-manganese at the same furnace.

6<sup>4</sup>. To exploit the damp ore which up till now has not been used in any other way, smelting tests should be arranged using all the actual raw materials in order to ascertain their smelting properties before any large investments are made.

### Low-temperature carbonization

46. Poor non-coking coal in the Jharsuguda District in Madhya Pradesh, which produced a coke ('char') almost free from phosphorus, with an ash content of about 17 per cent and possibly lower, and with better electrical and mechanical properties than those of the more expensive so-called metallurgical coke, is very available. This no-char could be next to ideal for the production of ferro-alloys and also for electrical pig iron produced in India and may constitute a reliable and profitable industrial enterprise independent of a possible ferro-alloy-producing plant in the State.
47. With the exception of a few cases where charcoals of certain types of **Red mud** of high purity are indispensable, coke calcareous dolomite is also relatively suitable for ferro-alloys. Some non-coking coal from Madhya Pradesh seems to offer good possibilities in this respect.
48. A most important precondition for a reliable production is a sufficiently uniformity of the fixed carbon content, i.e. sufficiently small short-term variations of the composition. A uniform content of fixed carbon depends on a high uniformity in the contents of ash, volatiles and humidity. All these are not reliably controlled if the coking procedure is performed adjacent to the ferro-alloy plant.
49. For economic production, i.e. lowest power consumption per ton finished product and highest output per day, the demand on a number of properties of the coke are very determinant. For instance, the reactivity should be as high as possible within economic limits. A high electrical resistance of the coke is also undesirable. The volume weight expressed as  $\text{cu. ft. per tonne}$  (and its inverse value used in England - the bulk density, expressed in  $\text{ft}^3 \text{ per ton}$ ) should refer to the actual shape and size of the coke when charged to the furnace. If sufficient good results as regards reactivity and charge porosity cannot be achieved with normal coke, furnace condition should be improved by replacing certain coke quantity with peat coke, charcoal, wood chips, raw coal and the like.
50. A carbonizing plant for the production of electric-metallurgical coke ('char') in Madhya Pradesh is recommended. Selection of coal for the coke production investigation and practical tests should be started at the Jharsuguda coalfields. These are said to have large reserves of consistent quality in a single seam. The other coalfields that have been mentioned should not be neglected. Not only the

The following table gives the results of the experiments made on the strength of the  
textile fibers. The following table gives the results of the experiments made on the  
strength of the textile fibers.

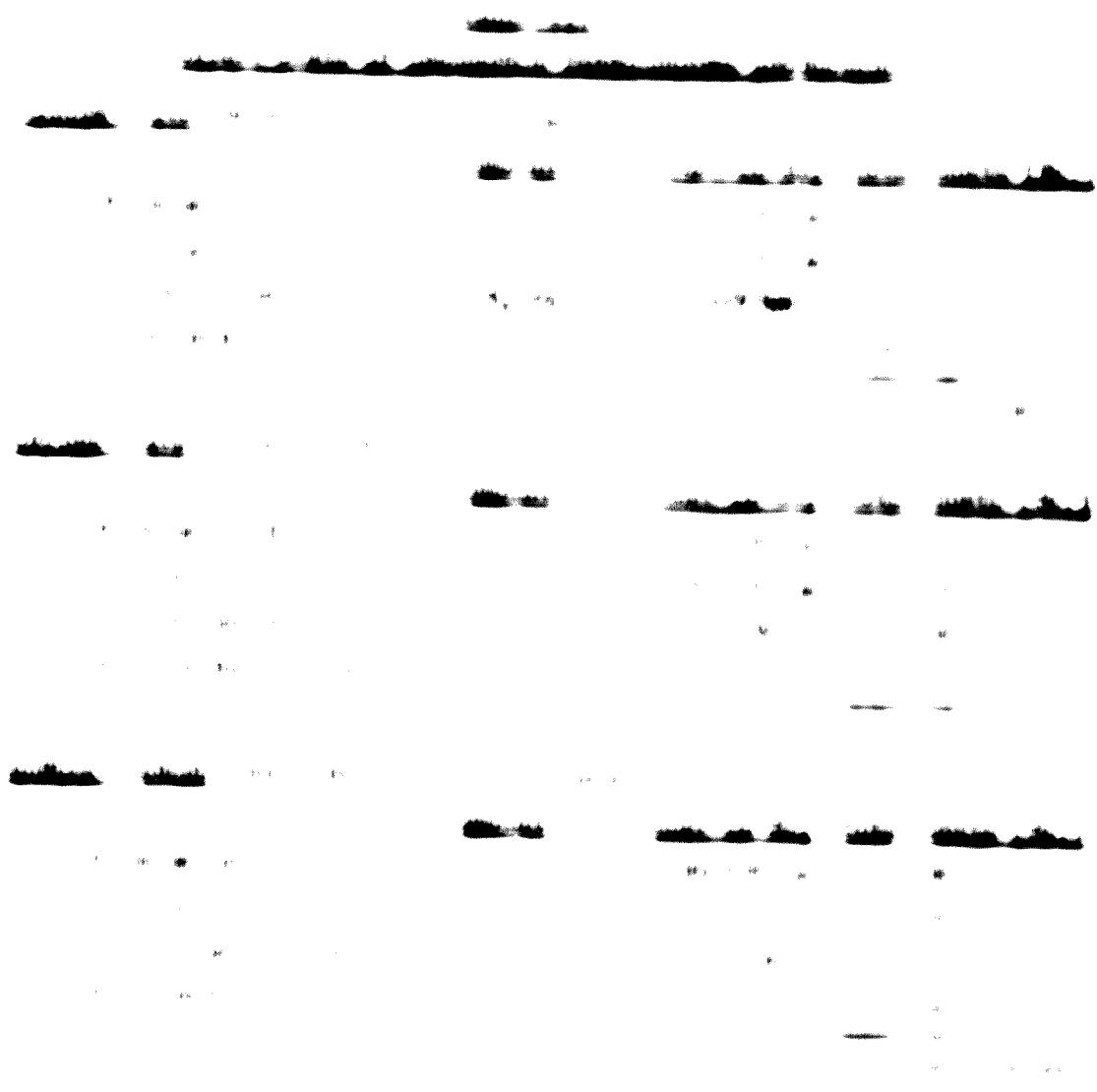
regarding the safety of the soil and the reduction of the oil content of the soil such that the Indian oil company can be satisfied that the oil content is less than the maximum permissible limit of oil content than the company appears and seems to have been satisfied that the oil content may reasonably be considered as safe. The experts are not sure as yet in the process, as the Indian oil company has not said what other substance to be added as safety. Indian oil company's present oil content of 10 per cent is based on the consideration as given to the reactivity and other properties of the soil. In case there is oil content of 17 per cent would be too high, the possibility of further reducing the oil content by adding the oil should be studied before switching over to other low-oil producers such as the expensive thermos.

In regard to the location of the softening plant, it is advantageous to place the plant near a river, especially with respect to the cost of shipping the plant and the ease in getting away in frequent boats.

The earliest economic unit that can be recommended for building and operating has a total throughput of 100 tons a day corresponding to 40,000 tons a year. Unless market investigation shows a considerably larger and sustained demand, this may be the minimum size of the first plant, permitting future of extension without large-scale modifications of existing equipment.

74. The estimated costs of the carbonation (flashing gas) equipment, for a plant of this capacity are Rs. 1.45 million, of which an equivalent of Rs. 750,000 will be needed in foreign exchange. Additional costs for carbon dioxide add up to Rs. 100,000, of which an equivalent of Rs. 45,000 will be required in foreign currency.





The first part of the year was characterized by a period of relative quietness, but in the latter half of the year there was a marked increase in activity. The most prominent feature of the year was the rapid increase in the number of birds seen, particularly in the latter half of the year. This increase was due to the fact that the weather was generally favorable for migration, and also to the fact that the number of birds present in the area increased during the year. The total number of birds seen during the year was approximately 10,000, which is a significant increase over the previous year.

For those who like

- (c) The production of a report of each specific toxic spill, from which detailed biological guidance. The chart shows the route of the spill, the type reported investigation from the earliest diagnostic point of view, and the properties and conditions of the toxic substance according to the different procedures established, i.e., (i) sample, (ii) PIG (iii) Roto & for (iv) Start State and (v) Dispersed, and recommended at the present existing tests and observations in a forthcoming pre-set report. The entire work is a job of toxic testing function, although not necessarily a full-time job, and can very well be combined with other related hazardous investigations.
  - (d) To analyze the possibility and best way of producing foundry plume free, for instance, the Rhinebeck plant, etc.

年	月	日	天候	風向	風速	潮位	水温	水深	水質	魚類	漁獲量	漁獲額
1986	10	1	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	2	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	3	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	4	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	5	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	6	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	7	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	8	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	9	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	10	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	11	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	12	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	13	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	14	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	15	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	16	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	17	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	18	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	19	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	20	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	21	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	22	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	23	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	24	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	25	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	26	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	27	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	28	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	29	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	30	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000
1986	10	31	晴	東	弱	中	15.5	15.5	良	鰯	100kg	100000

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

The SW expert has been requested to advise the USG on the best course of action for Right-of-Way length-changes and to propose the best possible alternative to India to exchange for a production of 100 short-term hydroelectric generating capacities. However, the expert has been informed that AISH does not propose taking up the term-change project immediately due to various reasons. The second best possibilities are to be found in Electro-Mechanics options in Banting with whom the meeting might be convened. The expert can arrange for utilized foreign collaboration.

the plant to be more or less powerfully, but uniformly, tinged at the nodes; at the same time the lower leaves became less numerous, the passing, however, of the plant having to be reduced by about one-half per annum, though apparently of quite increased size, though

The question of the operating power charges for iron productions and iron ferro-alloy plants, operating partly on the world market was dealt with in the Report, Part I, para 77, where the expert recommended to regard 4 Paisa as an absolute upper limit, but for exceptionally favourable raw material conditions, and even to be rather wary when the power price exceeds 3 Paisa. Particularly during an initial period the Indian metallurgical industry will no doubt need all precautions as regards



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This is a long time ago - the right "President" can implement a simple policy and  
order and subsequently gets the support to come up with the next fifteen years  
have to be reflected by the other Indian nations.

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About 7.7 million tonnes of wood or oil products (industrial based forest) are estimated currently in Quebec province. Forest inventories are available through the Pre-Investment Survey. Baseline availability in 1966 for paper industries is estimated at 520,000 tons/year (without taking into account the reduction due to forestry).

11. The sugar mills are producing 64,000 tons of bone-dry bagasse per year and are likely to step up production to 145,000 tons/year with the expansion of sugar

102. The paper mill at Durgapur has been mentioned earlier. The paper mill at Ranchi is also located in Jharkhand. The paper mill at Ranchi is owned by the Jharkhand State Paper Mills Corporation. The paper mill at Ranchi is located in Ranchi, Jharkhand.

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### Site location and arrangements

103. In view of the sufficient information about the availability of fibrous raw materials in the future, three possibilities are suggested: (a) rice straw printing and writing paper, Bilaspur region; (b) pulp mill or pulp and paper mill, Jagdalpur; (c) bamboo-based unit in Orchha or Bhopal.

11. The following table shows the estimated costs of production of paper pulp and paper in Russia. It is necessary to emphasize that the figures given in the table are estimates and do not represent the actual costs of production. The cost of production of paper pulp and paper in Russia is estimated to be 100 million rubles per annum. The cost of production of paper pulp and paper in the U.S.S.R. is estimated to be 150 million rubles per annum.

#### Estimated Costs of Production of Paper Pulp and Paper

12. Further studies and continuing experiments are necessary for determining the most effective way to produce paper pulp and paper in Russia. It is recommended that the Ministry of Finance should take into account the following factors when determining the cost of production of paper pulp and paper in Russia. In regard to the cost of production of paper pulp and paper in Russia, it is recommended that the cost of production of paper pulp and paper in Russia should be determined after consideration of the cost of

13. The pulp and paper industry in the Soviet Union is based on state-owned enterprises, or privately owned, state-owned and state-owned enterprises. Before starting a new enterprise in Russia

#### Conclusion

14. For an integrated paper mill, the capital required for the establishment of the plant and the paper machine, the design of which is to be determined by the Ministry of Finance, is estimated to be 100 million rubles. The cost of production of paper pulp and paper in Russia is estimated to be 100 million rubles per annum.

#### Implementation of the Recommendations

15. For the paper mill, the gross profit on the investment is estimated at 15 per cent for pulp and 10 and 14 per cent for paper and 12.

#### Final Recommendations for Consideration

#### Conclusion

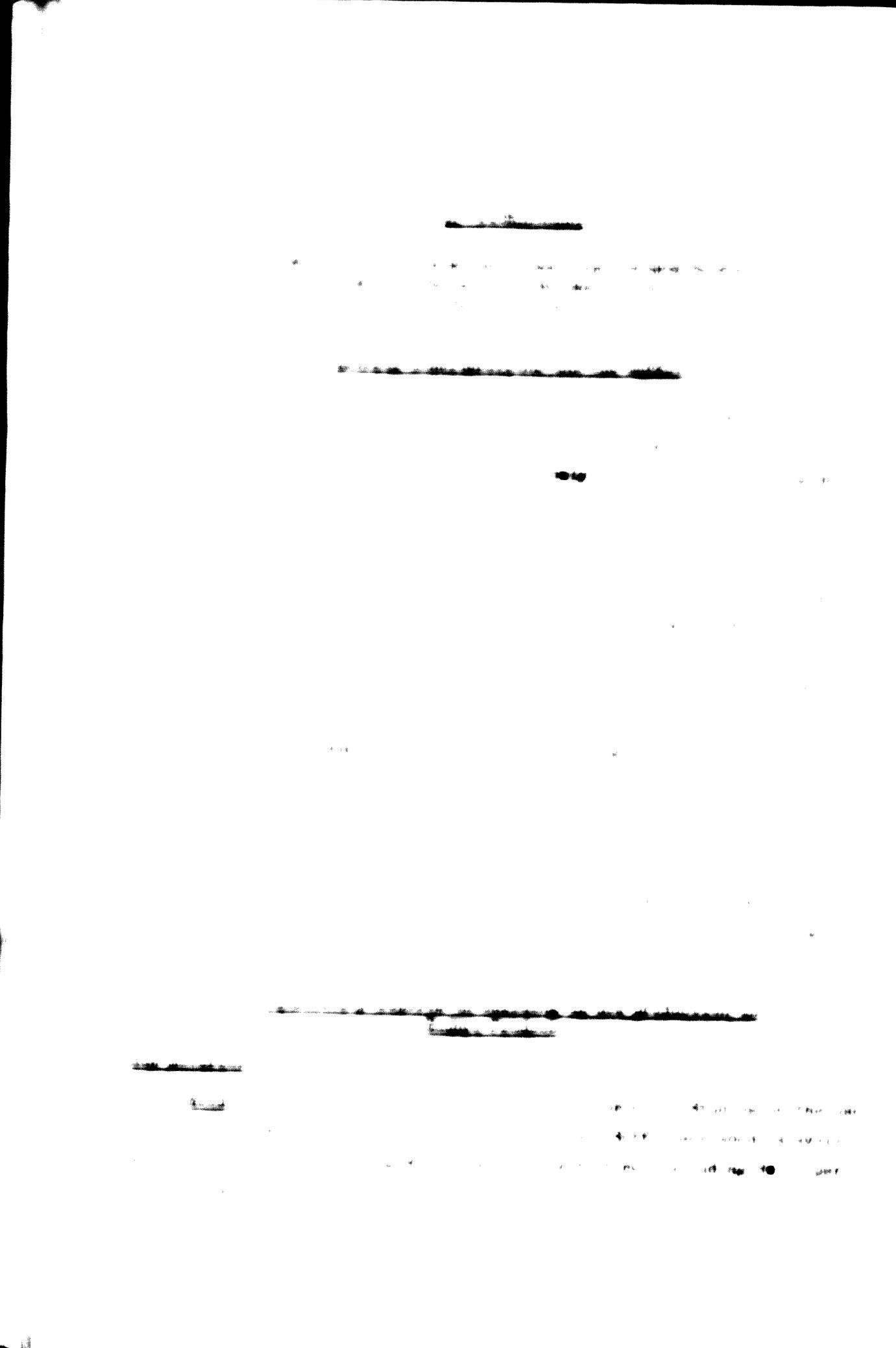
16. The demand for paper in Russia State in 1965 was 10,000 tons. The projection of paper demand for 1970, 1980 and 1990 is respectively 37.6, 135 and 300 thousand

the paper mill will be able to supply the paper to other mills for a long time, probably until 1960. Thus the new project cannot be started.

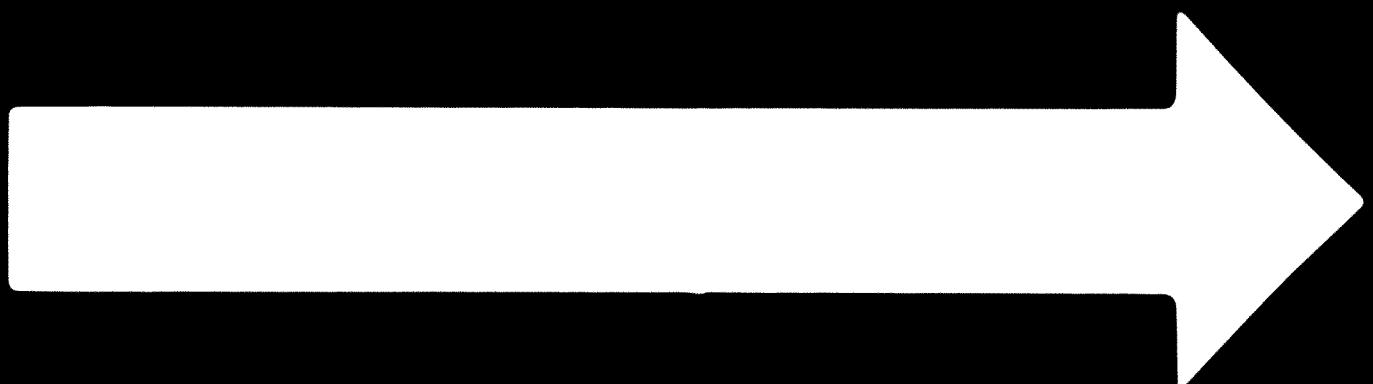
The new plant will be built at Paper Mill No. 1, 40,000 tons to 60,000 tons per year. Only a few years ago it was 10,000 tons to 40,000 tons per year and the new project will be Kao Lin paper mill (printing and writing) 21,000 tons per year or

1. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

2. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

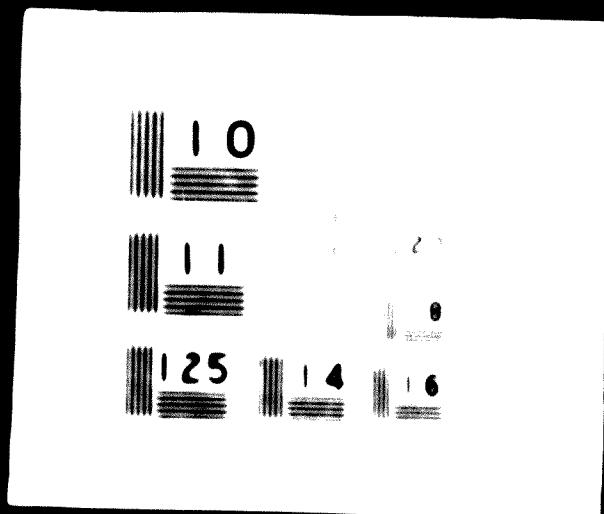






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## Cost of Production

The cost of production of iron ore in India is very high. The cost of production per ton of iron ore is Rs. 100/- to Rs. 120/- in India. In U.S.A. the cost of production per ton of iron ore is Rs. 20/- to Rs. 30/-.

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## Manufacturing Cost of Iron and Steel

The cost of manufacturing iron and steel in India is Rs. 10/- per ton for a 10,000 ton capacity mill working at 40 percent of its capacity. The market price today is Rs. 400. For the same mill working at only 40 percent of its capacity, the selling price works out to Rs. 114 which is comparable with the ruling market price of Rs. 450. The selling price of iron and steel in India reaches only 44 percent of the installed capacity.

It is 100 tons per year capacity is economically superior to a 10,000 tons per year capacity when the yearly output is more than 14,000 tons.

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and the results were compared with those obtained by the same methods in the work of the author.<sup>2</sup> The results are given in Table I. The following conclusions may be drawn from the comparison of the two sets of results:  
1. The effectivity of the new method is about the same as that of the old one.  
2. The new method is more rapid than the old one.  
3. The new method is more convenient than the old one.  
4. The new method is more accurate than the old one.

Possibility reports on alluvium accumulation  
in Mysoor State

## Raw materials

1935. About 60 per cent of the total forest tonnage of 14,000 tons is concentrated in the four districts of North Kanara, South Kanara, Mysore and Shimoga. The quality of the forest is good. A total of 4,000 tons per year of suitable wood for fibro-cement and slate-wood are available within 40 miles' distance of each of the four centres, viz. Khajapur and Dandeli in South Kanara, Sagar in North Kanara and Shimoga. The cost of this wood, including Rs. 1/- for royalty, is estimated at Rs. 5/- per ton ex-factory.

#### Utilities, infrastructure and supporting construction facilities

189. Londa is about 16 miles from Khanapur on river Pundheri. It is well-connected by road and railway communications and power lines. However, data about the water flows in the river Pundheri are not available.

140. Dandeli is situated on the bank of Kalinadi; there are already two mills, viz West Coast Paper Mill and the Indin Plywood Manufacturing Co. The fibre-board mill could operate in conjunction with the existing wood industry taking advantage of some of the external economies. The river seems to have sufficient water flow.

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1.  $\frac{1}{2} \times 10^3$   $\text{m}^3$   $\text{min}^{-1}$   $\text{kg}^{-1}$   $\text{min}^{-1}$   $\text{K}^{-1}$   $\text{min}^{-1}$

It is also important to note that the new system will not affect the existing system of grants-in-aid. As it is at all times possible to apply for grants-in-aid under both systems, there will still be ample opportunity for the world to work together in the field of health.

### Figure 1

The Petropavlovskiy, Tugayev, and First stimulus and others in  
the same system of my Project.

FACTORS IN LOCATING A PAPER MILL

149. The following factors should be considered in determining where the paper mill should be located:

Government in the market

(1). Whether there is a government in the market which will give favorable tax treatment to the manufacturer. In the United States, the government has given favorable tax treatment to manufacturers of paper products. This is mainly due to the fact that paper products are first article.

(2). As the factory should be located near the market, it should be in the interest of the government to encourage the manufacturer to locate in the market. It is also important that the government should be willing to permit the manufacturer to import raw materials, the manufacturer and the consumer. It would be difficult for the manufacturer to continue to import raw materials if the walls and other items such as windows, heating, floors,

Economic factors

150. Investment and production costs depend to a great extent on the size of the mill, presuming, however, that the production capacity will be fully utilized. On the other hand, it is important that the mill is situated in an area assuring sufficient supply of wood, not too far away from the main market and with a good transport system. All these factors must be investigated and taken into consideration. It is also important that the different mills cover their special market area. If possible, it would be wise to make a market division between the different manufacturers.

Export possibilities

151. Fibre-board can to a certain extent be an export article. Eighteen percent of the whole world production of fibre-board is exported. The United States of America and the United Kingdom import fibre-board. Also countries

the first time in the history of the world, the people of the United States have been called upon to make a choice between two opposite ways of life.

The one way is the way of freedom and democracy, the way of equality and justice. The other way is the way of slavery and oppression, the way of inequality and injustice. These two ways are irreconcilable. They cannot coexist. One must give way to the other.

The people of the United States have a choice to make. They must choose between freedom and democracy, or they must choose between slavery and oppression.

THE IRON AND STEEL INDUSTRY IN INDIA  
 THE WORLD'S FIFTH LARGEST PRODUCER

4. In addition to the output of steel from integrated plants, there is an intermediate point with respect to pipe production. This is the case in the United States of Hainan Province and Manchuria, where the iron and steel industry is linked to India's steel pipe production. It is also the case in the Soviet Union, where a review of pipe production indicates that the output of pipe is increasing rapidly, and for the finished product, the output of pipe is second only to the output of steel pipes in a developing country. It is also the case in Japan, where the output of pipe production of pipes of the same size, thickness and length is increasing rapidly, and plays an important role in the production of iron and steel products.

Table 1.8

Steel pipe and tube output in selected countries, 1960-1964  
 (in thousands of tons)

	USA	Western Europe <sup>a</sup>	%	Castings/ barrels <sup>b</sup>	SSP	Japan	India
1964	7,449	5,377	1,260	2,46	5,171	1,763	124
1963	6,555	5,070	1,094	2,44	4,721	1,204	84
1962	6,399	5,215	1,058	2,17	4,574	1,349	133
1961	6,072	5,023	1,106	1,57	4,551	1,713	156
1960	6,330	4,625	1,343	1,629	5,301	1,227	105

Source: The European Steel Market in 1964, table 26, p.70, Document ST/FCE/Steel/16; and National Monthly Statistics for Selected Industries of India, February, March and December 1965.

a/ Belgium, France, Italy, Netherlands and Federal Republic of Germany.

b/ Czechoslovakia, Eastern Germany, Hungary, Poland.

Report of Joint Committee on Steel Pipe Plants

- ✓ Construction of plant
- ✓ Production of steel pipe

The following report is submitted to the Government with brief comments on manufacturing methods and costs. It provides for separate establishment of two electric-weld plants for the production of steel pipe, one each in the States of Maharashtra and Madras. The processes adopted in the layouts suggested for these units are known to be technically feasible; for the conditions proposed therein, they are shown to be economically acceptable also.

157. In view of the present situation in India, it is recommended that the Government should take steps to encourage the setting up of pipe mills in the country. The estimated capital cost of a plant producing 1,00,000 tons per annum has been estimated at Rs. 67.10 lakhs (Rs. 67,10,000/-) which includes relatively high fixed charges which determine the economic viability of the project. In these circumstances, the report recommends against the proposed seamless plant project at present. Instead, an alternative recommendation is made for the establishment of a spiral-weld pipe plant in Madhya Pradesh, producing 1,00,000 tons a year and having an initial investment of Rs. 67.10 lakhs (Rs. 67,10,000/-). The plant designs and layouts shown in the drawings included in the report reflect a background that includes the design, construction and operation of at least 5 pipe mill plants of substantial size in the United States of America, Venezuela, Argentina and Chile and a large number of in-built project designs.
158. A survey of India's steel pipe requirements, current and for the Fourth Five-Year Plan period, has provided the main information needed for establishing plant capacities and for adopting various kinds and size mixes of the tubular production and pipe-making processes. The most recent market demand evaluation by NCAER has been reviewed and broken down. By 1971, India's tube demand is expected to reach 900,000 tons of which 80 per cent may be electric-welded and 20 per cent seamless. Taking present capacities into account, the deficit in pipe producing capacity is calculated to equal about 150,000 tons a year in seamless and 400,000 tons in welded pipes. Of the latter, more than half will be in diameters about 10", and no less than 20 per cent will be absorbed in the southern regions of the country.

162. The estimated cost of production per ton of pipe, for 20,000 tons a year on an average of 20 x 0.437" size, is Rs. 1120. Thus the manufacturing return of Rs. 70 per ton should render an annual gross earning of Rs. 14.0 lakhs. After accounting for a 4 per cent depreciation on capital investment and 53 per cent income tax on net annual return, the write-off period works out to be 12 years or a return on the investment of about 18 per cent.

#### Marketing and Distribution

163. The proposed plant will produce pipes for the construction of roads, railways, canals, tanks, dams, irrigation projects, etc. The market for the product is limited to the State of Bihar. It is estimated that the demand for such pipes in Bihar will be 20,000 tons a year. The market for the product outside Bihar is negligible. The estimated selling price of the product, after deducting all taxes, is sufficient to cover the cost of production and 10% profit. This represents a selling price of Rs. 1,190 per ton. Should the demand be limited to the State, an annual production of 10,000 tons would indicate the pay-off time of 12 years.

#### Management

##### Plant site

164. A site area of 10 acres close to one of the State's larger communities, such as Bhagalpur, Patna or Bhiwani, is desirable.

##### Cost of production, earning and rate of return

165. The estimated cost of production per ton of pipe, for 20,000 tons a year on an average of 20 x 0.437" size, is Rs. 1120. Thus the manufacturing return of Rs. 70 per ton should render an annual gross earning of Rs. 14.0 lakhs. After accounting for a 4 per cent depreciation on capital investment and 53 per cent income tax on net annual return, the write-off period works out to be 12 years or a return on the investment of about 18 per cent.

4. PLANT SITES AND SITES

164. **INDUSTRY OF THE STATE**  
MANUFACTURING STRUCTURAL UNITS AND OTHER HEAVY INDUSTRIES  
(MAY 1964)

165. The report observes that the location of the proposed plant at the establishment of a heavy structural unit in the State of Madhya Pradesh will bring with it the following advantages. First, there is a capacity of 8,000 tons annually which is more than double the capacity of the existing units which are scattered throughout the State of Madhya Pradesh. The new plant will not be situated in a remote area within a 10-mile radius of the Chhatarpur-Waghai road. This location offers the availability of the main industrial facilities such as railway and road transport systems, water supply, and telecommunication facilities. First, it will have favourable effects upon the market demand from the nearby establishment of other heavy structural units. Most immediate is the prompt availability of raw materials for expansion and modification plans.

166. The new plant should be operational in two-shifts and able to produce 8,000 tons of fabricated structural units annually. Based on the estimates of the Industrial Programmes for the Fourth Five-Year Plan for Madhya Pradesh, December 1964, the existing fabricating capacity, of under 10,000 tons, will be sufficient only for half the demand of 8,000 tons of heavy structures estimated for 1965/6. Thus, an adequate domestic demand and market already exists to readily absorb nearly twice that of the output within the State of Madhya Pradesh alone and many times that amount in India. The report judges that conditions are at present quite favourable for investment - private or public, Indian or foreign - in a new structural fabricating enterprise, and especially in the State of Madhya Pradesh.

Process considerations

167. Indian structural producers maintain their preference for riveted fabrication over welding even though they concede the latter's potential superiority and inherent greater efficiency. The main justification is economic. Acceptable welding of steels becomes increasingly difficult as their carbon contents go above 0.20 per cent. Indian steel makers produce only a limited quantity of steel meeting this standard. Another factor is the comparative

the plant will be built in the first half of 1988 and will start production in the second half of 1988. The plant will have a capacity of 10,000 tonnes per annum. The investment required for the project is Rs 10.5 million. The plant will be located in the industrial area of Dharavi, Mumbai. The project will be funded by the company's own resources and external sources. The project is expected to generate employment for about 100 people.

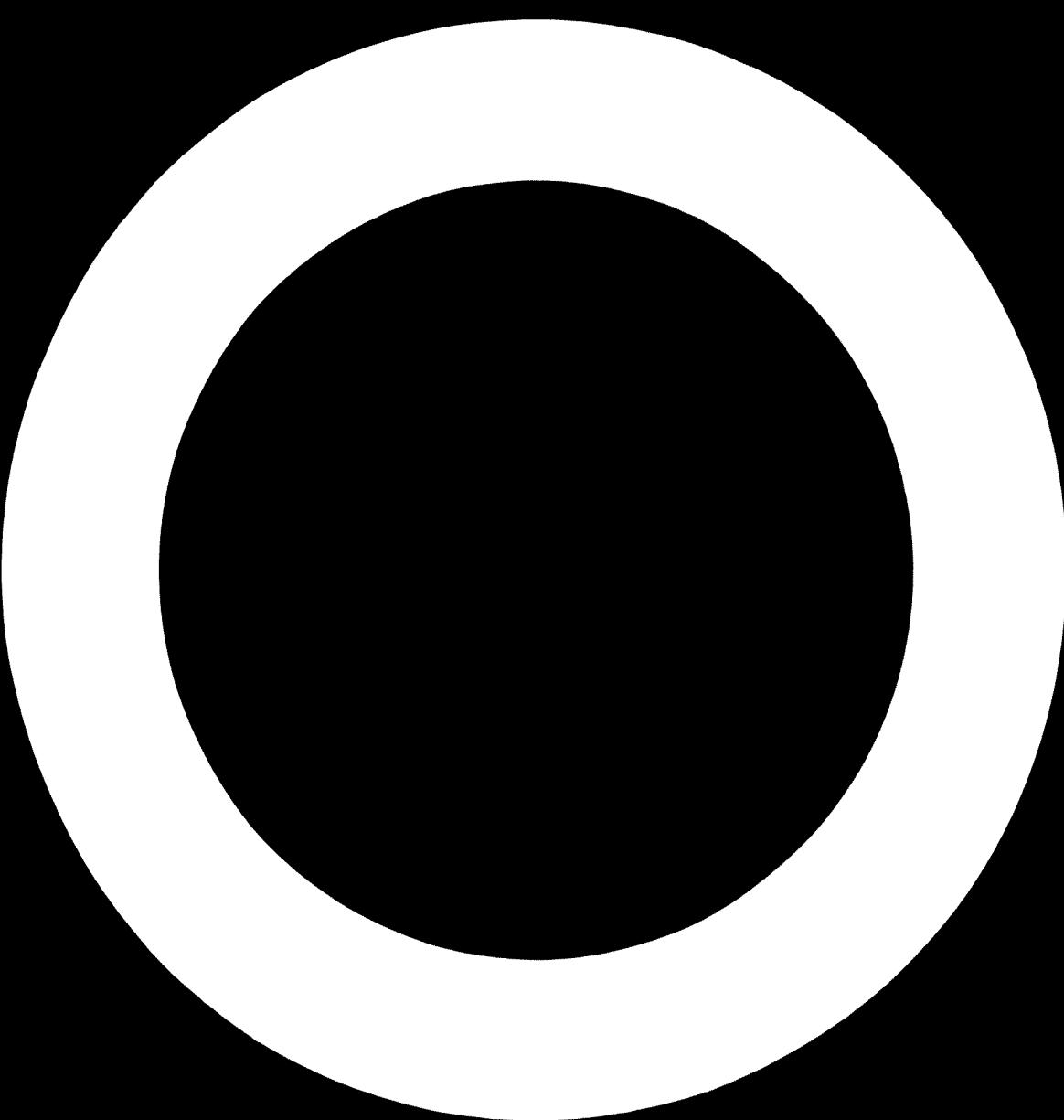
### Project Details

The project involves the construction of a plant to produce stainless steel pipes. The plant will have a capacity of 10,000 tonnes per annum. The investment required for the project is Rs 10.5 million. The plant will be located in the industrial area of Dharavi, Mumbai. The project is expected to generate employment for about 100 people.

### Project Profitability

The projected net returns of the plant have been estimated at Rs 1.51,000/- This will be reduced to Rs 1,28,000/- after deducting an average 10 percent depreciation in capital cost. With income tax at the reduced 11.5 percent, the remaining annual net profit should come to Rs 462,000. Divided into Rs 10.5 million investment, this is equal to a 5.4 percent return on payment period of 18.4 years.

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the following statement of the problem:

The problem of the present study is to determine the effect of the introduction of a new species on the existing species in the same habitat. This is done by seeking for the commonalities existing in the two communities, namely, new and old, and then examining the possibility of their co-existence.

The first step in this study is to define the scope of the problem. This is done by defining the following terms:

- **New species:** A species which has been introduced into a new habitat or environment.
- **Old species:** A species which has been present in a habitat for a long time.
- **Habitat:** The environment in which a species lives.
- **Community:** A group of species living together in a habitat.

After defining these terms, the next step is to determine the effect of the introduction of a new species on the existing species in the same habitat. This is done by seeking for the commonalities existing in the two communities, namely, new and old, and then examining the possibility of their co-existence.

Part IV  
IV  
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IV. ANALYSIS OF THE WORK OF THE EXPERTS AND THE PROBLEMS

1. The first problem was the definition of the subject. The experts were asked to define the subject in their own way. At first, definitions were given which did not fit the reports. Then new definitions were formulated. The experts' definitions were collected and analyzed. The following definitions were examined:
- a) The problem of the development of the internationalization of the economy and the economy of the socialist countries. This is a very broad definition, which includes all the problems of the economic development of the socialist countries. It is also a very general definition, which does not give any specific information about the problems of the economy of the socialist countries.
- b) The problem of the formation of the international economy, which is a more specific definition. It is a definition of the economy of the socialist countries, which is formed by the socialist countries, which are joined together according to the principles of socialism (international economy without institutions).
- c) The problem of the "internationalization of the economy, which is understandable" by the experts. This is a definition of the economy which becomes more effective and important for the socialist and other socialist influenced people. The experts do not want to emphasize the importance of the economy to the point where they will be able to understand it easily at the international level.
- d) The problem of the "internationalization of the economy, which is not defined to the foreign countries". It is a definition of the economy which should have been extended together with the socialist countries, but not to the foreign countries, because the actual conditions and circumstances of the socialist experience in this regard. The work of the experts with the report (especially in the States) to define and explain the term and method of work would have been of great value.

AVAILABILITY OF INFORMATION AND BACKGROUND MATERIALS

2. This was the most difficult problem connected with the work. All experts complained about non-availability of data, thus much of their work was confined to collection of data and search for background materials. As a result of these efforts, many new facts and problems requiring attention were brought to light. This is one of the most valuable features and achievements of the reports.

3. Although the reports remained somewhat scarce in data and information, the experts discussed and elaborated a broad range of questions and problems

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indicating what had been done in the industry, what could be done and how and how these differences could be utilized. But, the experts' report was not many new studies and reports. Some of the important types of the same were listed in para 10 of the main body of the experts' report itself. In the follow-up process, the experts' recommendations which carried forward should be taken up to furnish the working information available on problems that have been opened up. This follow-up work will also be useful for strengthening and promoting capability for carrying out feasibility studies.

#### Organization of the work

##### The plan of operation

8. The plan of operation was not worked out in proper way. No provisions were made in case the contemplated prerequisites were not supplied (this means lack of data or counterpart, impossibility to collaborate on some point for objective or subjective reasons and so on). In the report on pulp and paper, out of 167 pages, 72 are on future demand. Data for report on the Central Pulp and Paper Plant in Madhya Pradesh were not available (they are not available as yet). The solution of Central Pulp Plant is to play great impact quantitatively and qualitatively on the Indian pulp and paper industry.

##### The plans of work

9. The experts for aluminum, ferro-alloy and fibre-board had some plans but not for the whole span of time. There are no records of plans for counterparts. The plans of work for experts and counterparts, individuals and participating organizations should have been worked out regularly. The work schedule and methods of drafting and execution of plans have to be stipulated in the plan of operation. Appraisal and evaluation of plan accomplishment should be regular procedure to prevent shortfall and waste of precious time. Although the methodology applied by the experts was in principle proper, the methods of application to achieve the contemplated results missed some important points such as association with the State authorities concerned, existence of plans and appraisals of work etc. Comments and letters of Under-Secretary from Madhya Pradesh spell that out very clearly and openly.

10. Waste of time should be avoided. Biases in or misdirections of the work should be corrected and rectified in time. By doing so it would not have happened that the expert carried out work he was not required to do or missed to

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and the counterpart unit; this was to be done in close liaison with the project manager of the United Nations. This was done through regular meetings with the manager, and also through a joint committee formed by the project manager, the United Nations, and India's now material resources, Bureau of Mines and Minerals, which comment on what it is they can do. The counterpart unit was asked to send a letter of the project manager to the United Nations stating that the counterpart does not have enough staff to do its present assignment effectively. Most of the counterpart units are very small and have no permanent staff. I work with a counterpart unit in the States, and at the moment I work with a small unit of the Bureau of Mines, which has a limited number of experts available to do the work assigned to them. In the example I was given, there were only two or three experts during the initial period.

#### Counterpart work and staff

16. Counterpart work and staffing of the item of importance in such studies. The expert usually will not be often in agreement with organizational set-up of source for data, and with the specific data he has to take into account what is being the study. He contacts is all the necessary investigations and collections of information, proceeding of the data and drawing conclusions by himself. In other words, speaking, if feasibility studies are usually to be carried by foreign organizations or institutions employing 11 kinds of experts, technicians and economists. At the beginning of the project there were many such counterparts within the institutional basis. Later on they were scarce, or totally absent. In the States the organizations were not taught and did not know how to arrange the counterpart unit. The organization (institute, department and so on) who were to participate in the project did not designate offices to take care of counterpart work. But all of them were willing to help. In some cases, questionnaires were sent out, which were answered but the respondents were not invited to collaboration. It is important to point out that the experts sometimes found volunteer counterparts who assisted them.

#### Review of the work of the experts

17. The assignments were short-termed and there is not much record of progress reports except for the last two studies (ferro-alloys and fibre-board). Comments on these were received only from the United Nations Headquarters.

13. **Outline of preliminary report** - The project was first discussed by the Co-ordinator and the members of the Project Committee. The members did not participate in the initial meetings of the Project Committee. The reports will have been finalized during the meeting of the Project Committee.
14. **Outlines for the final report** - The outlines of the final report were fibre-board. The first outline was prepared by the Co-ordinator. The draft of the final report were discussed in the Project Committee and fibre-board at the meetings held in the State and Central level with the representation of Ministers. It is a very important aspect of the final report that the reports need to be developed and written in such a manner that it is encouraging of good and applicable reports. Such a procedure would help to highlight the good and mistakes in the findings and the observations.
15. **The work of the Co-ordinator in the project** - It is a difficult task. The definition of the project was not firm and exact. There were many of them - the missions for depth, pre-investment, industrial survey, the project leader, Chief of the Mission, Co-ordinator, Director of the project and finally the Co-ordinator. The duty of the Co-ordinator was to gather, co-ordinate and write the consolidated report (according to the plan of operation to put together all reports and to write summarizing forward). The first project leader had written (not in India) two reports on industrial subjects.
16. **There was change of views about the duty of the Co-ordinator**. The first Co-ordinator prepared industrial subjects to be examined, through the meetings with the State and Central authorities and departments, worked out the plan of operation and inquired about availability of experts encouraging some of them to take up assignment with the project. The second Co-ordinator surveyed the work done and what had still to be done, assisted experts in the field to get job done, initiated, fostered and took part in the follow-up work together with the relevant authorities, brought out the new plans for studies, wrote the consolidated report and some other reports, developed five papers for guidance of organization and contents of the feasibility reports and many other papers on different subjects.
17. **It is necessary to record that from the very beginning there were some disputes about the scope of the Co-ordinator's work**. There is no record of

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19. The views of the experts assisting from the United Nations, Director, Technical Cooperation Department, and the Director of the Department General Services, the Secretary, and Joint Secretary of the Government of India, regarding the organization of work and the implementation of the State Plan, and the project, were as follows:

Organization of work

(a) It is necessary to make the organization of work as follows: the fact that the experts of the project will be engaged in the organization of pre-project surveys, it is necessary to provide the experts of the experts organization, which will be responsible for the organization of the investigations. This plan, however, is considered to be a good organization of UNTA for the work in the project, and the organization of the project, service arrangements and some definite tasks were carried out by the experts for ferro-alloy and ferro-chromium, the metallurgical industry. Otherwise, this task was accomplished during the course of meetings and investigations. Naturally, in the first place, when these topics, more knowledge could be imparted to them who have full knowledge and work in that subject. But there was not much discussion on tasks and there was no systematic training in an organized way. The following organization developed in the project scheme. The review of the project, studies for planning of priority study, the consolidated report and the experts' report on the project in their direction.

Conclusion and recommendations

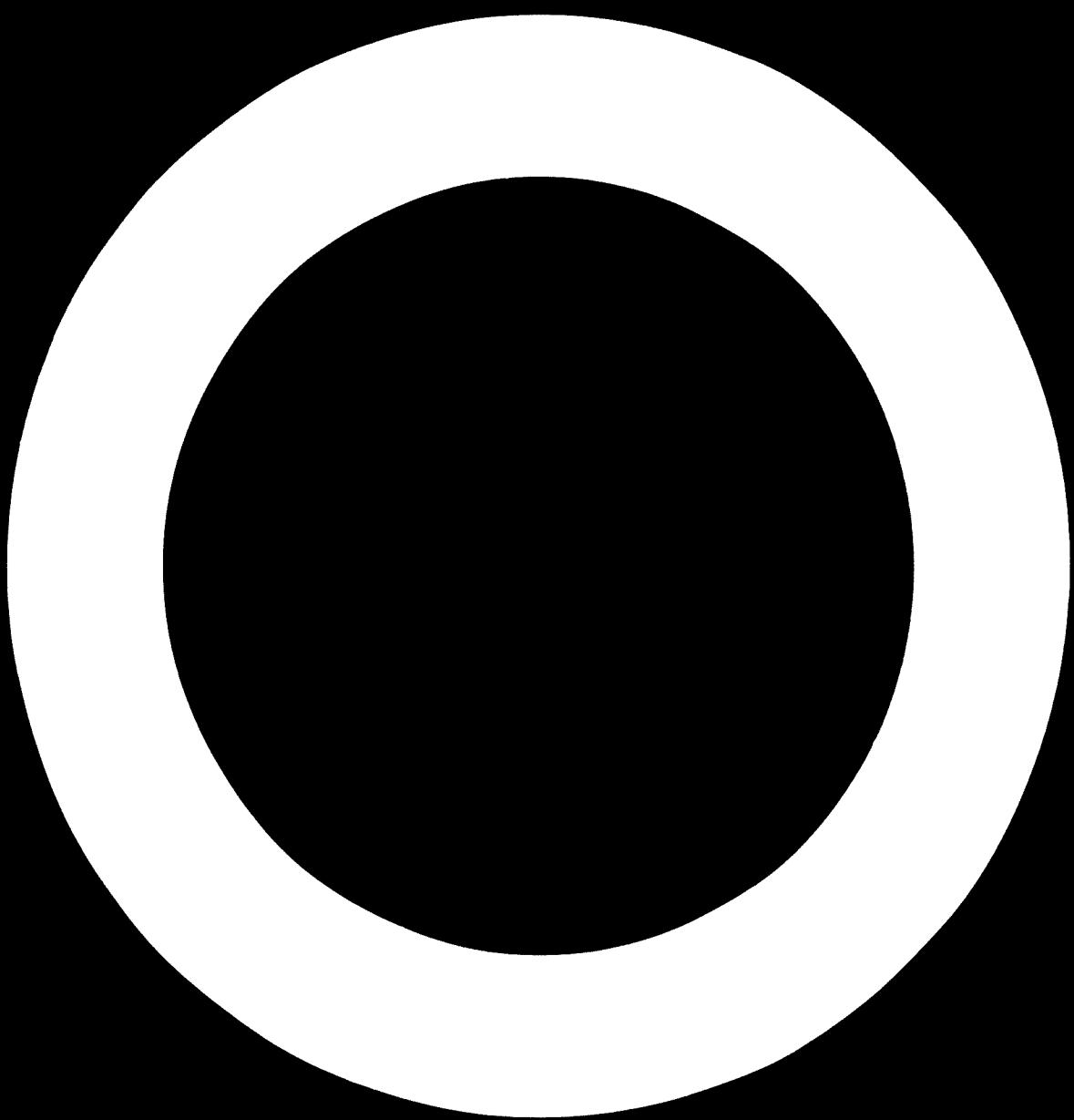
17. The work in this project was a good attempt to organize and execute United Nations Technical Assistance to India. From the achievements as well as from shortcomings of the organization and procedure, it is possible to draw valuable conclusions and experience for the future work on feasibility studies with the assistance of United Nations experts or by local specialists exclusively.

18. It is necessary to appraise and evaluate the reports as such and the organization and procedure of work and to take decision on the organization of work (i.e., selection of institutional basis, counterpart work and staff and also on the United Nations experts' work organization). The Co-ordinator's duty has to be assigned very carefully.

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APPENDIX  
Part I

1. The organization and procedure for evaluation of projects will be improved if the organization and procedure follow the following work schedule: Up-to-date and documented in writing, the project plan, the project experts' and co-ordinators' reports to be final.

2. Such projects require very much the involvement of the local or representative's office in the course of preparation of the plan of investigation and background material, as well as in the course of implementation of the task.



REPORT ON ORGANISATIONAL CHANGES

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- 1. Outline of the organization and principles of work
- 2. Counterpart work and staff requirements
- 3. Scheme for increasing the theoretical and practical knowledge in expert's field

1. In the course of the United Nations industrial investment survey project in India, there will be the need for some guidance on work organization and procedures to assist the United Nations experts, Indian counterparts and other participants in handling the different aspects and phases of work and to help them in fulfilling the specific duties assigned.

2. The three sections presented in this annex are not intended to prescribe any strict limits or boundaries of the work, but to delineate the basic, minimum outlines and guidance so as to avoid misunderstanding about the basic questions of the project studies, work organization and procedures. They are intended to help the work to proceed smoothly and to have the contemplated reports well done.

3. With the active and creative approach of participants to this project, the guidance enumerated in these papers ought to be improved and amplified along with the progress of the study work itself. Such an approach will result in the ultimate goal of this project study, that is, to enable local experts to proceed with the study themselves.

#### A. OUTLINES OF THE ORGANIZATION AND PROCEDURE OF WORK

##### Identification and selection of the industries for surveys: Preparatory stage one

###### Preparation of the list of industries

4. Initiation of and proposals for the list of industries could be done either by the Planning Commission, the State Governments, the United Nations' Representative or Agency or other Organizations. Initiation move starts with giving the reasons, ways and means for taking up the surveys and contemplating respective participation in the surveys.

5. Elaboration and compilation of data and background analysis for taking up decision are the next steps. When initiative is recognized and agreed upon, the initiator together with the co-ordinator of the project (from the United Nations side) will collect and complete the background material in fulfilment of the prerequisite analyses (see annex 4).

### Selection of industries - decision taking

6. The decision is taken in consultation with the participants concerned with the study on the basis of fulfilled analyses. The decision includes the definition of the surveys and the types of report expected for each survey in the form of the preliminary project formulation. The procedure for the submission of the report should also be prescribed.
7. The decision also implies the identification of participants (country organisations and individuals and other contributing agencies to the survey) with the responsibilities and duties they will undertake in the accomplishment of the survey. (See annex 3, section 8). The sponsors of the surveys, the institutional base and their role are also to be determined and the extent of their participation in the project to be made clear. Financial and other arrangements, local expenses, physical and secretarial facilities have to be distinctly formulated.
8. Finally, the rough schedule of work for the expert(s) and counterparts, time distribution and estimated time schedule for duration of each phase of work should be prepared at this stage.
9. All the above definitions and decisions should be put together for any particular survey or a group of surveys in the form of a plan of operation. Plan of operation could be developed for a certain period of time if it is convenient. Plan of operation must be distributed in advance to all participating in the survey.

### Final work before start on development of the report: Preparatory stage two

#### Getting experts

10. First job descriptions for the expert have to be drafted, which have to be considered and approved by the sponsors in States and in the Centre. This should be followed by requests to the UNDP resident representative and headquarters for approval.
11. The recruitment of the expert(s) is done by the headquarters in consultation with the resident representative. The government authorities (sponsors) then scrutinise the curriculum vitae and choose the expert.

### Preparation of the investigation plan and discussions with the expert

The planning of the investigation work starts with the preparation and the assembly of the investigation team. The first step is the preparation of the work instructions for the experts. The investigation team consists of the experts, their assistants, the co-ordinator, the counter-parts and the sponsors. The investigation team has to be well coordinated so that the investigation work can be carried out smoothly. The investigation team may consist of one or more experts.

In case of the joint investigation, the time required for the preparation and the expert's time of investigation will be longer. It should be necessary to form a team of experts and their counterparts and sponsors who have enough material and personnel available for the expert's time of investigation.

14. Before finalizing the investigation plan, the preparation of the investigation plan with the relevant organization.

### The work with the expert in the field realization stage

#### Investigation work and final formalization and definition of the survey

15. Investigation work includes the transfer of the expert by the resident representative, the co-ordinator, counterparts and sponsors. Development of a plan of work for the expert and counterparts has to be carried out by the expert and counterpart with the assistance and guidance of the co-ordinator and approved by the sponsors.

16. The spending time of the expert has to be undertaken with the guidance of the co-ordinator and counterparts. All available data and material have to be examined.

17. The collection of additional data and information has to be done with the help of either questionnaire or actual field work through interviews and other investigations. Execution of the above is the responsibility of the expert and his counterparts with the full co-operation and assistance from appropriate organizations, such as statistical institutions, government departments and agencies, research institutes, associations of producers (engineers and the like), existing production units and finally the customs revenue, taxation and other offices. Valuable data can be collected by field trips, visits to project sites and discussion with the local offices.

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和而不同，就是說，我們在尊重別人的意見時，自己也應該有主見。

At this stage, the first author developed a research proposal based on our results and our hypotheses and implied that our findings were consistent with those of other researchers about findings and no significant differences between the two groups in terms of age.

During the whole period of the project, there should be regular progress reports. The preliminary report should be submitted at the end of the project report. The progress report should be reviewed periodically to check the progress of work and the fulfillment of plans in order to carry out the project successfully. This will be done by the sponsors and the contracted agency.

The Department of the Environment

22. The draft of the final report is to be developed jointly in advance with all individuals and organisations concerned and the United Nations Headquarters to consider and ask for some modification, amplification or additional analysis. The discussions and comments on the progress and preliminary reports should be taken into consideration in drafting them.

23. Discussions on final draft report with appropriate organisations, potential users, counterparts and the like are essential. These should be followed by the finalisation of the report and submission of the same. The procedure for this will be developed in the plan of operations.

The other notable residential unit of the project

24. One of the main purposes of this project is to increase the level of theoretical and practical knowledge in the expert's field. This calls for planned and systematical work of the expert. (A separate scheme for this part of the expert's work is developed in annex 3, part C.)

The general nature or contents of the report is developed separately and enclosed in Annex A.

1. The present report is based on the following assumptions:  
 a) The project is implemented in a timely manner and efficiently by the existing industries  
 b) The project is implemented in a timely manner and efficiently by state-owned enterprises  
 c) State-owned enterprises are able to implement the project under the given  
 financial and technical conditions.

2. The report is based on the following assumptions concerning the implementation of the  
 industrial project:  
 a) The project is implemented in a timely manner and efficiently by the existing industries  
 b) Experience can be drawn from similar projects.

3. All these assumptions will be checked during the implementation of the project.  
~~and~~

#### Implementation of the project findings and recommendations

##### Recommendations

##### Acceptance and evaluation of the report and other work of the project

20. The parties concerned should evaluate and criticize and correct all aspects of appraisal and evaluation, and then determine on the basis of the study assigned and implemented experience.

##### Composition of the coordinated report

21. This could be developed in the framework which is found in in the specific project, taking account of the appraisal and evaluation meetings, conclusions and observations.

##### Follow-up process

22. This process is more often the work of the counterparts and sponsors but the United Nations is also interested in it for the sake both of evaluation and improvement of the future undertakings.

23. Counterparts and sponsors should follow up implementation of reports and try to think about the necessary development or rectification of shortcomings and mistakes and errors, if any. The final evaluation of work carried out and the summing up of the case is to be done independently by the UNIDO unit as well as by the sponsors. The government should supply necessary information to the United Nations for this purpose. The United Nations representative and the co-ordinator of the project will be directly involved in the follow-up process throughout.

THE UNITED NATIONS AND INDIA

13. This document is intended to give the India mission a comprehensive description in the counterpart's work and staff requirements. It is to this purpose that the experts of this project - the United Nations expert assigned to the study from the State or central institutions and the mission assigned to work with the United Nations expert in study - shall work together and the United Nations expert is to make available to his counterpart the relevant experts and specialists and vice versa.

United Nations work in the field

14. Before going to any particular explanatory note, it is necessary to stress once again that an United Nations expert in this or any other mission is necessarily an investigator and accomplish work by himself and in accordance with the United Nations assignment to associate the work of United Nations expert with domestic experts and specialists of the country from the government departments, institutes, institutions, enterprises, associations and the like. Counterpart's participation is inevitable in the course of the study in India with the collection of background material to the completion of the project.

15. One of the main aspects of the United Nations expert's work is to promote and stimulate interest of counterpart in the study. In this way, a report could be prepared and implementation secured with the necessary divergence in the level of the method and practical knowledge an expert's field which is again one of the main purposes of United Nations assistance. To associate the appropriate State or central organisations with his work and duty is one of the most important features of the expert's assignment. Doing that, the expert realises that the meaning of the word "co-interpreter" belongs to all of them who participate in the accomplishment of the assumed duties as requested by the Government of India but he has to differentiate between directly assigned particular state and central level co-interpreter organisations or individuals from those organisations and individuals who with full responsibility and goodwill participate and contribute to the accomplishment of the task of the study but are not engaged regularly and in a stable manner as the former ones.

### Arrangement, counterpart work and staff

35. The work requirements for counterpart staff were defined in the "Plan of Operation" of the FAO participation at its start as follows:

"The arrangement will be in terms of reference of the project Indian counterpart staff is to be assigned for their work. In the initial stages, the following officers have been designated: the Director of FAO, the Geologist, Metallurgical engineer and a fourth assignee, whose name, however is to be designated.

"Director of FAO is to serve as the counterpart of the Mission leader, and he will be responsible for the FAO participation in the work. "The fourth member of the FAO staff who is occupied with more or less that are both technical and administrative in nature, generally, therefore, not be able to devote more than half of his time to the work of the Mission. Metallurgist and Geologist are to be retained on a full-time basis to the Mission."

36. With regard to state authorities the "Plan of Operation" includes the following definitions:

"The establishment of a local section in the Industries and Commerce Department, to work directly with the Mission's personnel is needed. These sections are to be headed by a technical officer, initially on a part-time basis and later (by about August 1965) full-time. The task of these State officers will be to maintain direct liaison between Mission's personnel in New Delhi and at NCAE to gather information and data requested in advance of the arrival of various Mission experts, to arrange and expedite the visits and inspections required by the experts in the course of their work in India, to accompany the experts on such visits and inspections and to provide all the technical and stenographic services needed by the experts."

### Sponsoring organizations

37. It is very necessary to underline that one of the most important factors in this project are sponsors. The project is sponsored by organisations at state and central level. They are: Secretariat of Industries, Directorate of Industries and Planning Commission. The achievement of the results of this project depends very much on their support, care and assistance. The sponsors take care of the whole assignment (domestic counterparts and foreign experts) and supervise the counterparts' work and review the expert's work regularly. The expert and counterparts are to submit regularly reports for reviewing their work and to seek help and support from sponsors.

The new schemes for counterpart work and staff

General principles regarding counterparts

38. The particular study (survey) requires the specific work from counterparts. This work shall be defined in greater details by the co-ordinator and his counterpart and it will be adjusted to the needs of the expert after his arrival in the country. On the basis of that, the counterpart staff requirements will be suggested and discussed. It is most important to ensure that counterpart work requirements are fulfilled. The question about the full-time or part-time engagement of the counterpart depends on specific circumstances and the experience and qualifications of the counterpart (capacity of organization or individual, specific need and complexity of the survey and so on).

39. Counterpart can be either a unit or an individual assigned to do the work on the particular pre-investment survey with the United Nations expert. Appropriate organizations are expected to co-operate and assist in that particular study. Counterpart (unit or individual) is specially assigned for that purpose only or some existing organizations (or individuals from it) are entrusted to perform counterpart duty as a part of their everyday assignment.

40. There will be counterparts in each of the States engaged in the project and also on the central level at the institutional base. Their work is to be co-ordinated well to achieve the best possible results of the assignment.

41. Counterparts (individuals and units) provided by sponsors have to be highly ranked to ensure spontaneous participation of relevant organizations (departments, agencies, institutes and firms or individuals).

Scope of the work of the expert's counterpart

42. In the following paragraphs a general description of counterpart work is given. In implementing the work all specific circumstances must be taken into account.

43. The counterpart has to prepare along with the co-ordinator and his counterpart, background materials for the study. For this, it is necessary to collect information and data required before the arrival of the project expert. This preparatory work includes the fulfilment of the prerequisite

analysis for the feasibility study as outlined in annex 4. In the course of preparation of back ground materials and elaboration of the report, the counterpart shall seek and get assistance from all relevant organizations and individuals. The association of state organizations with the project study is one of the most important tasks of the counterpart and of the project personnel and is essential for the success of the study and implementation of the report's recommendations.

44. The counterpart has to assist and guide the expert in spade work, to help him in dealing with problems and to enable him to work under specific conditions in the country which is new for him. These are the main functions of the counterpart. Further, the counterpart should go along with the expert during the investigation and assist him in collecting data and other information required.

45. The processing of data and working out analyses of particular aspects of the study, especially those relating to specific Indian conditions (economic and market analysis, national profitability analysis etc.) are also the functions of the counterpart. Co-operation in the final stages of the report elaboration, i.e. drawing up conclusions and recommendations as well as drafting of final report, is also required from the counterpart.

46. Thus the counterpart becomes, depending on the particular requirements of the report, a full collaborator of the expert. At the same time, collaboration with the potential users and relevant organizations is essential for achieving good reports adjusted for application under specific conditions and according to the needs of the country.

47. The improvement of the level of theoretical and practical knowledge in the course of the study is one of the main aspects of the counterpart's work to enable him and his organization to resume the survey without the guidance of foreign expert.

48. After the submission of the reports, the counterpart should take care of their distribution, explain the achievements, findings and recommendations to the potential users and concerned organizations and also get the reports appraised and evaluated. Well prepared discussions with the concerned organizations will stimulate their active participation in these discussions.

and in the implementation of the recommendations of the report. This includes the endeavour of counterpart's side to get the report recommendations better utilized by the appropriate organizations. It should take care also of the extension of reports or of the simplifications of some aspects, if necessary.

49. Counterpart at state or central level should take care of all administrative and technical work for the study and processing of data and drafting of report.

50. It should be noted that the work of a particular counterpart or individual, especially that of co-ordinator, differs according to the specific requirements but falls within the above listed duties with the specific way of performance. The whole work under study is to be adjusted to the specific conditions so as to facilitate the work of the expert and also that of the counterpart himself.

#### Examples of counterpart staff requirements

##### In the States of Madhya Pradesh and Mysore

51. There are five main schemes: three in the metallurgical field and two in the wood-based industry. For these schemes a team of three men is necessary: (i) a metallurgical engineer with experience in the field of ferrometallurgy (especially pig-iron and ferro-alloys) who is also capable to deal with over-all questions in aluminium metallurgy and chemistry; (ii) a chemical engineer experienced in pulp and paper, and fibre-board studies and (iii) an economist or an officer with experience in industrial development planning, investment policy and economic analysis.

52. Full-time assignment depends on the duration, phase and stage of the work under study. The part-time assigned officers must be clearly told the length of their engagement and the definitions of their assignment. Decisions on either full-time or part-time counterparts depend on the specific situations. The point is, that for the accomplishment and success of the study, there is an evident need for certain specialists to whom the co-ordinator, his counterpart and the experts could turn for all the help required for the study and who would participate in the work systematically and permanently.

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53. The immediate task of counterparts in Madhya Pradesh and Mysore is to take stock of the accomplishment of the studies in progress (i.e. on ferro-alloys and fire-clay) and to follow up submitted reports.

In the State of Gujarat

54. Four schemes are proposed for Gujarat: Marine chemicals, fluorite chemicals, textile machinery and design organization for petrochemical plant equipment and machinery. For carrying out the feasibility studies for these proposed schemes, a counterpart team of four men is necessary: a mining engineer or geologist, a chemical engineer, a mechanical engineer, and finally an economist or an officer with experience in industrial development, planning, investment and economic policy.

55. The immediate task of this team will be to prepare all analyses for schemes to be taken up for feasibility studies and to compile background material for the expert's work. In the beginning, there is no need for full-time personnel but later on with the experts in the field, it will be necessary that out of these four specialists at least two will be engaged full-time for this job.

Central level counterpart staff

56. The institutional base organization provides part-time counterpart for the co-ordinator. For each expert, the institutional base organisation provides, if necessary, a full-time counterpart specialist in the field. Full-time engagement is necessary from time to time; it becomes inevitable, however, in the final stages for the drafting of the final report and for establishing necessary considerations. Considering the specific needs of the study, the institutional base provides from time to time the assistance of investigators, economists and secretarial services.

57. The institutional base also ensures co-operation and assistance of the relevant departments, agencies, institutes and government authorities and looks after the administrative and technical assistance and facilities required for the project work.

### C. SCHEME FOR INCREASING THE THEORETICAL AND PRACTICAL KNOWLEDGE IN EXPERTISE

58. To provide requisite knowledge and experience to engaged participants is an important aspect of the project which an expert is undertaking. In addition to the well organized and properly guided work of the project, the expert produces not only comprehensive reports but also grants valuable training and raises the level of theoretical knowledge of the engaged participants. The field for the latter is broadened when the stage of implementation is reached and the need for proper interpretation calls the expert to make the things clearer. This sort of knowledge can be provided in either of the two ways (both as well); (a) simultaneously with the survey work; (b) as a parallel but separately organized work.

#### Simultaneously with the survey work

59. This demands close co-operation between the expert and other people engaged in survey projects and needs a definite portion of time to be devoted for providing knowledge and training. This can be performed in three phases.

##### First phase

60. The first phase begins with the investigation work. The expert conveys his knowledge and experience in methodology and sequence of work. Through his work the expert imparts scientific methods of investigation and this approach to the study lends opportunity to the counterparts and other participants to gain knowledge and experience.

61. The next step begins with the preparation of a questionnaire for the collection of data and information which should be developed with explanatory notes in such a manner as to capture the attention and hold the interest of the investigator working on them. Through the questionnaire the expert can foster and stimulate the investigator to learn more and to study deeper. To serve this goal the questionnaire has to be prepared very carefully and comprehensively to have stimulating effect and not to be merely an outline for filling up the statistical data requiring only technical and routine work.

61. Through the contacts, interviews and co-operative work with all involved officers and specialists, the expert should entertain questions and answer in a way which could help them to gain knowledge and experience. In the course of work, evidently the expert will be asked questions in the field broader than that of the specific study he is doing. This will help to make the things clearer and widen the spread of knowledge.

Second phase

63. Drawing up findings and conclusions is a creative process which brings out good opportunities for providing knowledge and experience. The expert should try to acquaint himself with the present and future development of industry and, in course of time, should associate himself with the highest possible number of counterparts (local specialists). This will help to provide training and will contribute to the better accomplishment of the report.

64. The expert should inform others associated with him about his findings and conclusions. He should arrange discussions and invite comments and suggestions from other specialists in the particular field of study. This is a good medium for spreading knowledge and experience and developing creative capacity of indigenous specialists.

65. When the expert receives comments and suggestions he can develop answers and explanations which will make good room for further communication of information and knowledge to the recipients.

Third phase

66. This phase begins with the drafting of preliminary and final reports in which the expert conveys new facts and materials on the problem of building up a particular industry. These reports should be discussed with the concerned institutions, individuals, potential users of the report and ultimately with those who have to implement the recommendations.

67. This is intended firstly to get new comments and suggestions and secondly to help the involved organizations and individuals to interpret the report properly and enable themselves to implement the recommendations and suggestions and finally to resume similar surveys in future. The expert should devote a chapter in his report in order to suggest ways and means to continue

with further investigation and enlargement of the report. This is supplemented by the discussions on preliminary and draft final report after which the expert gives explanatory notes.

Courses, seminars, symposia and special discussions

68. This type of training to be imparted needs a lot of preparation. It needs approval by the resident representative and in specific cases, it should be approved by the headquarters with possible assistance from their side. Such training is impossible without domestic organization and sponsorship. The need for this kind of work emerges if imparting of training throughout the whole investigation period is properly conducted.

69. The experts of the projects need to take advantage of any occasion to participate and attend the courses, seminars and the like which deal with some topics related to his work organized by some sponsors (might be other than those connected with his project). They have to take part in proceedings and discussions and to contribute to its success. The experts will surely gain knowledge for their own work too.

70. Courses, seminars, symposia and discussions especially organized to deal with the questions of the study and/or for imparting training by the experts to participants are highly important for increasing theoretical and practical knowledge.

71. It is advisable to arrange special courses, seminars, symposia and discussions for conveying the knowledge and information concerning the study which is taken up. For this, the other experts in the field could be invited by the UNDP representative to contribute and also some domestic experts to take part in it. All this needs the assistance and help of the sponsor of the project, the UNDP representative and the counterparts.

72. This work requires a highly organized system with relevant papers prepared carefully, background materials and other necessary prerequisites. The experts ought to be informed about their duty in advance and preparation has to be made at proper time while enough knowledge about the domestic problems is gained and unrestricted support from the potential participants obtained.

73. Any one of the latter mentioned forms of training could be organized on a small-scale on the spot within some departments, factories or even with counterpart staff. Again participation of domestic specialists in the field of study is very important. These forms have to deal with some specific questions of the study - technological, technical or economic aspects. The lessons have to be supported with real illustrations from the local practices and problems.

74. An expert could be asked to take part in some training activities outside his terms of reference. He might do this within his ability, available time and facilities.

Annex 4

GUIDANCE FOR TAKING UP FEASIBILITY  
STUDIES AND FEASIBILITY REPORTS

Contents

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FEASIBILITY ANALYSIS OR DECISION MAKING STAGING IN THE FEASIBILITY STUDY

Prerequisites

Feasibility analysis

1. Prerequisite analyses are necessary to identify the nature, scope, process, broad location, rough estimates of total investment cost and profitability of the proposed project which ought to be further elaborated in the feasibility report. If they are prepared in advance, the feasibility study can be accomplished within a relatively short time and with a high degree of accuracy. These background analyses enable the expert to formulate the project well and to foresee the period and other resources necessary for the accomplishment of the project. Due to the above facts, this phase in sequence of project development is a very determinative one.

Feasibility report

2. The feasibility report or pre-investment survey consists of technical, economic and marketing evaluations of any or all of the following aspects: a detailed technical and economic analysis of the project, including an evaluation of the marketing aspects, recommendations on sites with particular reference to the availability of water, power, transport and other utilities, approximate costs of the project at a selected site, estimates of optimum production capacity, analysis of the raw materials available, audience for finances (in local and foreign currencies) required for plant, equipment and working capital.

Content of prospective analysis

Analysis of the market situation and demand for the contemplated products

3. This analysis relies on:

- (a) The plan targets which are described as the prospective figures or as the strategic objectives of the Plan  for (i) the State and  
(ii) All-India.

Planning Commission has issued Notes on the Prospective Development of India for the Period 1969/70 to 1975/76 in which statistical data on expected consumption and production of a large number of commodities and products are given.

- (b) The available statistical data on production and consumption trends in the country. This can be presented in two parts - (i) the demand and production and (ii) the All India demand and production.
- (c) The production and/or consumption trends in the United States and in a similar developing country and a developed country.
- (d) The feasibility of exporting the products, trends and development of international trade for the proposed products.

**This analysis, though not a detailed one, must supply sufficient information in general terms, and also show the scope for the product and its place in the proposed development of the country.**

#### Analysis of technical feasibility

##### **4. Investigations on technical feasibility cover the following five items:**

- (a) The possibility of processing the existing raw materials with the given technological process. The information here should be based on the laboratory investigations already done or in progress.
- (b) A comparison of the contemplated technological process with the existing processes in the country and abroad.
- (c) The existence of know-how locally or the feasibility of getting it for the country.
- (d) The availability of the technical skills (scientific, engineering and technical manpower) for production.
- (e) The existence of supporting industries.

#### Analysis of resource requirements and their availability

##### **5. The basic resources included in this examination are raw materials, water, power and transport utilities and labour.**

###### **(a) Analysis of raw materials -**

- (i) Quantities and qualities available from various sources
- (ii) Technological properties of raw materials (results of laboratory investigations)
- (iii) The estimated costs for natural resources industries on-work production cost and for other industries the availability of raw materials at profitable price for the proposed product(s).

###### **(b) Analysis of other requisites -**

- (i) Water - quantity and suitability for the purpose
- (ii) Power - present situation and future plans
- (iii) Transport - availability and future conditions.

###### **(c) Analysis of labour.**

Initial  
Analysis  
of  
Alternatives

7. Each element of the analysis should be based on the best available information. The following analysis should, however, be most important and useful in helping to determine **initial** **options**.

Analysis of the alternative projects

8. This analysis should be concerned with the resources available and the amount of resources available with the other possibilities in the country. These should be compared with the advantages and disadvantages.

Analysis of the economic factors

9. This section of the initial analysis should include the following:
- Estimation of costs of construction in comparison with the existing production facility or with the figures in the literature for foreign installations if applicable.
  - Capital investment required for capacity other than the existing one and its nature.
  - The cost of maintenance of the equipment from the existing facility.
  - Cost of materials and supplies.
  - Working capital.
  - Corporation taxes and profits.
  - Other cost factors not mentioned above.
10. **Approximate unit costs**. These can be estimated by comparison with similar facilities elsewhere in the country and abroad. The indices of the unit costs may also be worked out by several methods. The method applied should be adequate to the specific situation and appropriate to the proposed field of industry.
- (e) Economic factors in different countries.

National benefit analysis

9. Within this analysis many difficult and very intangible factors quoted cannot be quantified. National benefit analysis is now more and more used as a method of calculating and justifying the feasibility of a project. This method very often offers an incomplete picture since more thoroughly. The real benefit-cost analysis is to be carried out in the feasibility report but some identification is also necessary at this stage. Thus the national benefit analysis should cover the following items:

- (a) Alignment of the project with the overall industrial development
- (b) Specific economic factors
- (c) Environmental impact assessment
- (d) Financial viability of the project
- (e) Development of the industry in the region
- (f) Organisational requirements of the project and its implementation
- (g) Other specific benefits
- (h) Other interrelationships in the area

#### ANALYTICAL ASPECTS

11. Included in this section of the programme for analysis are factors which can be favourable to the undertaking studies:

- (a) Alternatives of expanding the existing plant or construct a new one. Preferences, advantages and disadvantages to be analysed.
- (b) Entrepreneurial interest and dynamics
- (c) Interests of the consumers
- (d) Others not mentioned above.

#### IMPLEMENTATION AND MONITORING

11. The success in doing feasibility study depends very much on proper organisation and procedures. A clear cut responsibility is necessary for the development of the study and afterwards for its implementation. Thus implementation somehow becomes the interest of this very preparatory stage for project implementation and realisation. The following information is therefore requested:

- (a) Clearer definition of the various participants in the process of development of the study and implementation
- (b) The methods to be adopted and the personnel for implementation
- (c) The agency best suited to sponsor the study, the construction and the operation.

#### DISCUSSION

12. Collection of information related to day-to-day statistical, operational, scientific and research work furnish the data which are the basic for doing these analyses.

13. The range of analyses represents the pattern of work but the final mode of work may differ in volume or in appearance for different industries and for different situations. Of course, any pattern can and should be improved in the

1. INTRODUCTION  
2. ANALYSIS OF INDUSTRIAL PROJECTS  
3. FEASIBILITY STUDY

1.1. In some cases, sometimes the compilation of analyses may also be a very specific task. It may happen that an incomplete analysis can satisfy the purpose because the study analysis will be invited. For instance, in the mining industry, the analysis of technological properties and quality of ore, and of the mining condition will be sufficient if no such world-wide standards exist which justify undertaking feasibility study with only these data. Even so, the best way is to elaborate all the analyses, then they then become the part of the feasibility report.

1.2. The reader should take note and expectation by the author that if these papers are further simplified and re-arranged by the illustrative cases, parameters and instances for detailed operations of industrial development, they - along with the other instructions on the same questions - may form a good and applicable manual for taking up the feasibility study by Indian institutions and specialists as well as departments and agencies when they sponsor the feasibility study. In this way another valuable contribution from a United Nations project towards identification of possibilities for the development and utilization of Indian resources for industrialization can be achieved.

1.3. The project personnel is grateful to all who helped them to ascertain and elaborate the possibilities for industrial development of India. So author expects comments and suggestions for making improvements in these papers and in the future work in the project.

#### For Further Reference

Feasibility Studies for Public Sector Projects. Management Group Committee on Plan Projects, Planning Commission, Government of India, May, 1966.

Profile of a Project Report. The National Industrial Development Corporation Ltd., Technological Consultancy Bureau.

Papers related to "Training Workshop and Orientation Seminar" on 'Project Formulation and Evaluation' organized under the auspices of United Nations Centre for Industrial Development and the Planning Commission, from 26 December 1966 to 21 January 1967.

Indian Financial Corporation's Instructions.

### B. GENERAL SCHEME OF THE CONTENTS OF THE FEASIBILITY REPORTS

16. The nature of the contents of any project report is determined above all by the purpose of the survey which is to present a report that is sufficiently authoritative and comprehensive as to form a basis for consideration by international and local investors for financial participation. To achieve this, a certain volume and depth of analyses, a number of alternatives and density of details with technical or economical emphasis etc. are necessary.
17. In the prerequisite analysis a broad view is given. The feasibility report deals with the concrete practical matter of the given case and conditions. For that, this example of outlines for contents of the report has been developed.
18. In any case, the report should be elaborated with as much detail as the specific area of industry (manufacturing) calls for. Each area of an industry has some essential features which must be taken care of and discussed to certain extent. Mineral-based, agriculture-based and forest-based industries, for instance, need detailed examination of raw material availability, its convertibility into the contemplated final product, cost of extraction or collection while others, like manufacturing industries, need concentration on the cost of equipment, capacity utilization and plant layout as well as the manufacturing cost, economic feasibility for ensuring the highest efficiency of management and production and competitiveness in quality and price. In some cases an important requirement is know-how and technical skill for implementation of the project when other factors are economically available. National benefit analysis should always be present in the report. This must be done in a broader way and in great detail to prove feasibility or unavoidability to take up some projects which might not be quite fully justified by the other analyses, especially the commercial profitability analysis. (These are exceptional cases and should be separately noted.)
19. In the Manual on Economic Development Projects, United Nations Publication, Vol. 58-II, C.5, the contents of reports are very thoroughly discussed and "Outlines for Presentation of Projects" are developed. These outlines are a good guidance for preparing reports. Another useful guide is the Government of India Publication Feasibility Studies for Public Sector - Planning Commission Management Committee.

### Contents of the report

20. The report will be developed along with the experience of each expert and on the basis of all background investigation and materials. Contents are usually divided in parts and chapters (the division and number of parts and chapters is due to volume of the study and number of distinct questions discussed and analysed):

#### Introduction - general consideration

- (a) A statement of the scope of the project - its importance in the State, its importance in the international context.
- (b) A statement on conditions under which the survey (feasibility study) was taken up, available prerequisite analysis and background material and other data, institutional basis and appropriate organizational set-up for investigation, collection of data and development of the report - limitations and disadvantages, vis-à-vis advantages for the work.

#### Part - I

Chapter I - The important facts and tendencies in production field:

- (a) The types and characteristics of the products, raw and auxiliary materials used and utilized technologies and processes to illustrate development, trends and temporary changes in the field.
- (b) Data on production and consumption patterns in the world and in some developing and developed countries. Presentation of the facts illustrative enough to enable one to do a comparative analysis towards internal production and consumption.

Chapter II - The main facts about industries - existing production in the country, plans for building up new production and main problems of production and consumption. This should be so developed as to show both the advantages as well as handicaps and disadvantages. This is very important when it becomes the background to conclusions and recommendations for building up new production lines on the basis of the survey report.

Chapter III - The improvements have to take place in order to increase production and better utilization of capacities. Discussions and recommendations on improvements in order to cope with the new achievements to avoid previous mistakes and bring about the production of existing capacities in line with the new proposed capacities in the report.

Chapter IV - The improvement and promotion of investigation and research work as well as legislative, economic and other measures in order to ensure the steady promotion of industry and to strengthen the institutional basis for research and development which will serve as a base for the proposed new production also.

### Part - II

This part deals with the concrete feasibility report outlines for the specific area of industry, State (region) and locations. These have to be elaborated fully with detailed explanations.

**Chapter V** - Market and demand analyses. This chapter is fundamental in the report regarding the need and feasibility for the new production. The analyses rely basically on plan targets and strategic objectives of economic policy.

**Chapter VI** - Raw materials analysis or input analysis with the alternatives of raw materials composition and substitution. This chapter gives all the necessary data on suitability of raw materials (and its economy) to build up the new production unit.

**Chapter VII** - Infrastructure, water, energy, power analyses. Availability and conditions, the prospects and trends.

**Chapter VIII** - Labour requirements and analysis of the same with the calculation of costs for training and their wage rates.

**Chapter IX** - Plant capacity and product-mix analysis with the analysis of capacity expansion and product-mix flexibility.

**Chapter X** - Site location alternative analysis with economic analysis for each of them.

**Chapter XI** - Technical and technological feasibility analysis. Know-how availability, technical availability, supporting industries and selection of the most favourable technology and processes.

**Chapter XII** - Equipment recommended and plant lay-out.

**Chapter XIII** - Capital cost estimates - investment cost analysis. Construction work, equipment and working capital. Foreign and domestic supply distribution.

**Chapter XIV** - Production cost estimates - economic feasibility analysis. Manufacturing return evaluation - input/output analysis.

**Chapter XV** - The national economic profitability analysis - quantified analysis and intangible benefits.

**Chapter XVI** - Financing consideration with budget forecast and investment expenditures time distribution.

**Chapter XVII** - Recommendations on implementation and project report preparation.

### Part - III

The by-product and integration production analyses.

**Chapter XVIII** - The product, residual or effluent analysis.

**Chapter XIX** - The integration - merge of production analysis.

### THE PLANNED INDUSTRIAL POLICY ANALYSIS

21. As illustration of fulfillment of or requirements analysis for taking up a feasibility study of a project, we take up the case of the pulp and paper project in the state of Madhya Pradesh. Of course, the illustrative case cannot be representative to the full extent. It is just an indication of how to start with the application of technique. The real case must have been more active and following the pattern by chapter and sub-chapters with the possible extension of the new facts as needed in the specific case (type of product, area of industries, region and so on).

#### Analysis of the market and demand

22. In the first step, it requires the projection of demand for India as a whole, the total possible supply and the derivation of unsatisfied demand thereby. Analysis of demand requires the knowledge of economic and demographic trends.

#### Plan figures

23. Plan figures indicate that the per capita consumption of paper in 1960/61 was 0.7 kg and basing the pattern of demand as an expected consequence of rate of growth of population, income and expenditure on education, rate of expansion of education and level of income, the target figure for 1970/71 is 2.2 kg and for 1975/76 3.2 kg per capita.<sup>2/</sup>

#### Statistical data on production and consumption

24. Record of statistical data shows that India has faced a shortage of paper except in 1965/66 and thus there was an unsatisfied demand. During the three plan periods, production has fallen much short of target specially during the Third Plan when production was only 77 per cent of target due to shortage of foreign exchange and domestic finance as well as lack of interest in establishing new units.

25. On the basis of 1 kg per capita, present consumption of paper and paper-board in Madhya Pradesh is estimated to be approximately 32,500 metric tons per annum. Assuming that by the end of 1975/76 and 1980/81 per capita consumption of paper and paper-board will increase to 3 kg and 7 kg respectively, and taking

<sup>2/</sup> Notes on Perspective Development of India, 1960/61 to 1975/76,

into consideration the increase in population, consumption in industry and use can be estimated to be approximately 11%, 8%, 214, 8% and 10% per tonne per annum by 1970/71, 1975/76 and 1980/81 respectively.

The production and/or consumption trends of the contemplated products in (a) a similar developing country and (b) a developed country

26. IAC estimates<sup>4/</sup> suggest that the world consumption of paper is continuously increasing with the rise in income, growth of population, increased literacy, new uses of paper, substitution in favour of paper, industrialization and changes in the system of distribution of marketing of consumer products. The growth rate in demand in developing countries is higher than in industrialized countries due to the low level of consumption and high income elasticity of demand but the absolute increase is low. In the 1960's and during the first half of the 1960's, the highest growth rate in consumption was in Asia, i.e. 15.4 per cent, the second highest was that in Europe. The over-all consumption is highest in North America followed by Europe, which together account for three-fourths of the world's consumption. Asia takes the third place, and the Union of Soviet Socialist Republics the fourth.

27. FAO has estimated that world demand for paper will increase from 31 million tons in 1964 to 124 million tons by 1970, 141 million tons by 1975 and ~~202~~ 202 million tons by 1980, showing an average growth rate of 5.1 per cent during 1964-80.<sup>4/</sup> The relative position of the various continents in world demand will remain unchanged, but the growth rate in Asia will be the highest, followed by Africa and Europe.

Demand in developing countries

28. If we look at Northern Africa, which consists of developing countries (e.g. Algeria, Libya, Morocco, Tunisia and the United Arab Republic), we find that they consumed about 315,000 tons of paper per annum during 1960/61 in which industrial paper and paper-board predominate (about 65 per cent). The future demand of paper in this region is expected to continue to grow at a fast rate. By 1970, ~~580~~ + 32,000 tons of paper may be required, which would mean a growth in demand by 6.3 per cent per annum. Paper demand by 1980 may be 1,145 + 190,000 tons, i.e. a growth rate of 7 per cent per annum.

<sup>4/</sup> The relevant figures can be found in the Demand and Supply Survey of the Food and Agriculture Organization of United Nations.

<sup>4/</sup> FAO (1966) Paper and Paper Development in Africa and Middle East.

29. The pulp and paper industry is well developed in this region but nearly half of the requirements cannot be met from regional production. It is expected that the industry will expand at a fast rate in future. By 1970, 65 per cent of the demand for newsprint, 60 per cent for printing and writing paper and 75 per cent for industrial paper will be supplied by regional production. The percentage of local supplies in three groups may reach 15 per cent, 10 per cent and 15 per cent respectively by 1980.

#### Demand in developing countries

30. If we look at Western Europe and the Union of Soviet Socialist Republics we find that the overall consumption has increased from 2.64 million tons per annum during 1950-1951 to 10.1 million tons in 1969/70, showing a compound rate of increase of 7.7 per cent per annum in one decade. The consumption in this region is likely to grow at the rate of 4.7 per cent per annum during the 1970s reaching a level of 13.62 million tons by 1975 (7.4 per cent increase per annum during the 1970s) reaching a level of 27.85 million tons by 1980.

#### Feasibility of export

31. In the past, supplies have not been in equilibrium with demand, there have been periods of shortages and surpluses. Till the middle of the 1960s there was world shortage but later on, surplus started developing which is continuing. The world supplies during 1964-1980 are expected to increase, reaching the level of 196 million tons by 1980 against the estimated demand of 202 million tons thereby suggesting some shortage in supply by 1980.

32. Due to regional and countrywise imbalances in demand and supplies, there has been substantial world trade. During 1954-1965, world trade in paper has increased from 3 million tons to 16.3 million tons, showing a growth rate of 5.5 per cent per annum. The growth rate during 1965-1980 is likely to be lower at 4.2 per cent per annum.

33. Table 4.1 lists estimates of the world trade of paper for various periods based on the assumption that 15 per cent of the world demand will be met from imports.

Table 4.1  
Estimates of world trade of paper up to 1980

	Volume of trade (million tons)	Growth rate per annum
1965 actual	16.35	-
1970	17.65	2.1
1975	21.21	2.6
1980	30.24	7.4

Source: Jain, Export Prospects for Paper, I.A., 1968.

34. India's share in world trade has been negligible, around .11 per cent in 1965. To boost exports, annual targets were fixed but actual exports have been far below those targets. It is proposed to increase the export of paper from 3,000 tons in 1965/66 to 120,000 tons in 1970/71.

35. According to the growth of demand and past trends, Asia should become the main market for India. Exports to Europe and North America have been negligible because of distance, uncompetitive quality and high prices. With regard to South East Africa, India has a locational advantage over the main competitors, except for Japan. Trading, cultural and political contacts, type of paper demanded and growth of demand at the rate of 3.3 per cent per annum in the 1960s and 6.7 per cent per annum in the 1970s are also favourable factors and offer good prospects if India can compete in price and improve its marketing techniques. This region also offers prospects for the export of paper machinery from India.

Table 4.2  
Suggested targets for export of paper and paper-board  
(in million of tons)

	Volume of world trade	India's export	India's share
1965 actual	16.35	0.002	0.01
1970	18.65	0.120	0.64
1975	21.21	0.212	1.00
1980	30.24	0.302	1.00

36. Thus, the trend of world demand and world trade and the suggested targets for export of paper and paper-board enhance the importance of taking up a feasibility study on paper and pulp.

#### analysis of technical feasibility

37. Possibilities for processing bamboo and other broad leaves species with the known technological processes are available. There are already technologies for the same in some other countries, especially in Japan. In the Forest Research Institute, analyses and pilot plant tests have been accomplished recently.

38. The know-how and technical skills are available, only further laboratory work and other investigations are necessary, which could be provided before a decision is taken. The consultation by some experienced forest expert may be necessary. Supporting industries exist in the country and only the more sophisticated parts of the equipment need to be imported.

#### analysis of the resources requirement

##### Raw materials

39. All-India aspect. Wood is the most widely used cellulose raw material in the manufacture of pulp and paper. There are two main classes of wood, viz coniferous wood (soft wood) having long fibres and deciduous wood (hard wood) having short fibres. Conifers yield fibres with a length of about 3.5 mm required for kraft paper whereas soft wood yields satisfactory quality of paper. The coniferous forests in India are in the Himalayan foot hills but the problem of their extraction and delivery to a mill-site at an economically cheap rate can be solved only when the transport and power systems of these regions are further developed.

40. Bamboo has a fibre length similar to that of the coniferous fibres on which the India paper industry mainly depends presently. Several important developments in pulping technology have, however, resulted in enabling the use of hard wood in paper industry in admixture with certain percentages of some long-fibred pulp which means that the importance of bamboo will continue even when hard woods are ready to provide a substantial auxiliary. Other cellulose raw materials available in the country for the pulp and paper industry are grasses, agricultural residues like straws (wheat and rice straws), linseed flax, bagasse (a by-product

of the sugar industry), jute sticks, waste paper and hosiery and tailors' cuttings and rags. The raw material requirements for the targets of production envisaged during the Fourth, Fifth and the Sixth Plan can be put at 4.20, 7.2 and 10.00 million tons in 1970/71, 1975/76 and 1980/81 respectively. Bamboo is currently available from the known resources to the extent of 700,000 tons per annum. A comprehensive survey of India's bamboo resources may reveal some additional quantities.

41. Madhya Pradesh, which has a forest area of around 67,000 m<sup>3</sup>, i.e. about 40 per cent of the State's area, enjoys a very good position from the availability of raw material point of view to the development of a paper and paper-board industry in the State. Bamboo occurs in most of the teak and sal forests of the State and is particularly prevalent in the following forest divisions: Balaghat, North Durg, South Durg, Mandla (East/West), Bilaspur, North Bilaspur, Raigarh, Korba, Jashpur, Surguja, Raipur (East, South and North), Bastar (East, West and North), Kanker, Renu, Shahdol, Sidhi, Umaria, Betul, Bhopal (East and West), Nords, Hoshengabad, Hirer, Dhar, Indore, Kurniad, Khargone, Chhindwara, Damoh, Jehulpur, Seugar, Satpura Sooni, Chhatarpur, Panna, Oura, Swalipur, Sheopur and Shipuri.<sup>5/</sup>

42. According to the information received from the Forest Department of the State, approximately 769,406 tons per annum of surplus bamboo is available in the State which can be utilised in the manufacture of dissolving pulp (rayon-grade pulp) and paper of high quality. Mixed deciduous woods are also available in certain regions of the State. Another important raw material which has been found very suitable for the industry is bagasse. About 100,000 tons of bagasse per annum (with 46 to 50 per cent moisture content) which, at present, are used in the boilers in the sugar factories, can also be made available for the paper and paper-board industry once the existing sugar factories in the State are supplied by alternative fuel (coal or furnace oil). In Madhya Pradesh, being predominant in agricultural production over other States of the Union, several other fibrous agricultural residues are also available which would be suitable raw materials for the paper and paper-board industry. These are mainly straw (rice and wheat), linseed flax, cotton linters and jute sticks. Hosiery and tailors' cuttings, rags and waste paper are also available in substantial quantity in the State.

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5/ Government of Madhya Pradesh Feasibility Report on Dissolving Pulp, Paper and Paper-Board Making in Madhya Pradesh.

### Technical and Economic Aspects

43. The cost of pulp and paper making is reduced at present by using the old methods of pulping which is slow and costly. In the south of the State, however, there is a large area where it is possible to use the old methods, but since the cost of the plant will be high, it is better to use a careful steam power pulping, which will reduce the cost of the plant at a much greater rate. The cost of the plant will be reduced by using only the steam power pulping, which will reduce the cost of the plant.
44. The minimum flow required for the permanent rivers is a very important factor after the minimum flow required for the establishment of the pulp mill. The maximum flow required for the pulp mill is the maximum amount of water required for the maximum flow required, i.e., 1,000,000 m<sup>3</sup>/day and a minimum flow of 1,000,000 m<sup>3</sup>/day. It is evident from the above necessary to take care of the flow, there is an important point to consider for the choice of a site, that is to say, the minimum flow should not only feed the pulp mill also ensure a good dilution of the effluents.
45. A suitable central pulp mill will require around 1,000,000 m<sup>3</sup> of process water per ton of pulp or paper tone a day of 1,000,000 m<sup>3</sup>/day (1,250 m<sup>3</sup>/hour). That can be recruited easily in any of the permanent rivers of Madhya Pradesh with the minimum flow.

### Labour force

46. As many industries in Madhya Pradesh are presently working without enormous difficulties in recruiting workers, it does not seem that a pulp or paper mill in this State will face more problems concerning the labour force than in any other part of India. The Madhya Pradesh Government is anxious to provide employment for its people. As regards skilled workers, the situation is no worse than in other States.

### Suitable locations

47. With regard to bamboo and other essential raw materials sources, there are two very good locations in the eastern region of the State for the establishment of a central pulp mill. One is near the village Niporia in Bilaspur Pahar of the Bilaspur district and the other is near Raynandgaon in the Dang District. Both

that the system is now being fully developed and will be available in the near future. The system is very flexible and can be used for a wide range of applications. The software is currently being developed and will be available in the near future. The system is very flexible and can be used for a wide range of applications. The software is currently being developed and will be available in the near future.

The Neenah River was a day long float from the mouth to the headwaters. The Menominee River upstream and the Little Chippewa provided the first part of the Neenah river. It is a pleasant float and has some great fishing opportunities. It ends at the Little Chippewa and the Neenah River continues downstream.

At Korba there is a thermal power station capacity of about 1000 MW. The capacity of this thermal station can be increased during the Fourth Plan period. This will meet the power requirements of the people. A high tension line is now under construction.

Mr. As regards the availability of various materials required for the works, it is proposed  
to start near Dapoli about 10 km from the railway station, against the  
thick sand available there. There are other nearby areas which are very close  
to the proposed site. Coal is available from all  
the coastal coal mining areas where a coastal coal mining plant will be established near Dapoli at the  
start of manufacturing the Fourth Year Plan period. These are essential chemicals except for  
sodium sulphate, which will have to be brought from a little distance, are  
available in close proximity to the proposed site.

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31. The other suitable location for the thermal power plant is near Rajnandgaon in the Durg district on the bank of Sonoth river. Rajnandgaon is a railway station on the Dhanbad-Bilaspur line of South Eastern Railway. It is about 162 km from the Bilaspur station, 44 km from Dehri, 55 km from Kumbha, 61 km from Jagarpur and 267 km from Korba along the railway line. The whole area is well served by roads. Rajnandgaon lies on the national highway connecting Dhanbad and Calcutta via Jagarpur. All sources of bamboo suggested earlier are well connected by road or rail. The requirement of power fuel, charcoals etc. can be met on this site from the same sources that have been discussed before.

THE PRODUCTION PROCESS

The production process consists of the following stages:

1. **Raw material**: The raw material is obtained from the local market at a price of Rs. 10/- per ton.
2. **Crushing**: The raw material is crushed into small pieces using a jaw crusher. The cost of crushing is Rs. 2/- per ton.
3. **Screening**: The crushed material is screened into two categories: fine and coarse. The cost of screening is Rs. 1/- per ton.
4. **Transportation**: The fine material is transported to the processing plant using a truck. The cost of transportation is Rs. 5/- per ton.
5. **Processing**: The fine material is processed in a ball mill. The cost of processing is Rs. 10/- per ton.
6. **Final product**: The final product is obtained after processing. The cost of final product is Rs. 20/- per ton.

**INPUTS AND OUTPUTS**

The production process requires the following inputs:

- Raw material: 100 tons per day
- Jaw crusher: 1 unit
- Screen: 1 unit
- Truck: 1 unit
- Ball mill: 1 unit

**OUTPUTS**

The production process produces the following outputs:

- Fine material: 80 tons per day
- Coarse material: 20 tons per day
- Final product: 20 tons per day

**INVESTMENT ESTIMATES**

The investment estimates for the production process are as follows:

Item	Cost (Rs.)
Raw material	1000
Jaw crusher	1000
Screen	500
Truck	1500
Ball mill	2000
Total Investment	6000

**ECONOMIC PRODUCTION AND MARKETING**

The economic production and marketing of pulp at prices comparable with international prices can only be achieved by designing sufficiently large capacities (300-400 tons/day) for these central pulp mills. The probable

### Investment Estimates

For economic production and marketing of pulp at prices comparable with international prices can only be achieved by designing sufficiently large capacities (300-400 tons/day) for these central pulp mills. The probable

independent of the market will be established in the country. It will have to be run on a self-sufficient basis and the cost of production will have to be kept at a minimum level. The unit will have to be set up in such a way that it can produce quality newsprint at a low cost. The unit will have to be set up in such a way that it can produce quality newsprint at a low cost. In these days of high cost of living, it is difficult to compete with foreign manufacturers if the product is not of good quality.

#### Targeted annual targets

75. The important targets of these five years are to increase the production of paper and paper-board, to achieve self-sufficiency and the raising of the standard of living of the people. In addition, there is also the need to increase the export earnings from paper and paper-board units.

#### Table

Targeted annual targets of paper and paper-board units

Year	Articles of paper and paper-board		Total
	Paper and paper-board	Newsprint	
1965/66 or 1967	1,50	—	1,50
1970	2,00	—	2,00
1974	2,50	—	2,50
1978	3,00	—	3,00

Considering the small export earnings (Rs. 70 lakhs in 1965/66), the above targets may appear rather bold. However, as India is starting almost from scratch, these targets can be within reach, provided India is prepared to make sacrifices and take the necessary action in time. If India is to increase the export earnings from this sector from Rs. 70 lakhs in 1965/66 to Rs. 45 crores by 1978, it has to increase production, reduce the cost of production and, if necessary with the help of fiscal measures like taxes and subsidies, improve the quality.

76. Establishment of a BIS in Dacca region will save the country from lossage of valuable foreign exchange in the import of newsprint. It will provide, on the other hand, employment opportunities to a large number of migrants from East Pakistan, Burma and Ceylon in the Dandakaranya area, the rehabilitation of whom has been posing a very serious problem before the Government. Total employment of 790 is likely to be generated directly with the setting-up of this unit and

about 2,000 people will be employed in felling, cutting, collecting, sorting etc. in addition the forest and the transport train.

2. Establishment of the paper and pulp unit in Madhya Pradesh will help in the regional development of this State. In spite of the availability in Madhya Pradesh of abundant supplies of both long fibred and short fibred raw materials suitable for pulp and paper manufacture and the central situation of the State in the country, which is a great asset from distribution point of view of finished goods, the development of the paper and paper-board industry in the State has been comparatively poor and tardy. Thus the establishment of the said units in this region will not only level the fruits of development but will lead to fuller utilization of the resources available, which at present are being left idle.

#### Conclusion

The above facts suggest and support that:

- There are prospects for the formation of a pulp and paper industry in India and in Madhya Pradesh particularly.
- There are raw material resources and other requirements for setting up such production in Madhya Pradesh.
- The technology is available in the country on the level to deal with the raw materials and utilization of residual materials of agriculture.
- The indications on economic feasibility also invite for profitable ventures in this industry.
- All the above suggest that taking up of feasibility study is justifiable.

Annex

OUTLINES FOR MANUAL FOR INVESTORS  
(PROPOSAL)

Introduction

1. The need to encourage existing industrialisation for investment in new production, and the development of all types of economic activities in India cannot be over emphasized. It also is evident that many kinds of brochures, handbooks and manuals are needed in order to inform the public at large and in an understandable way of prospects for investors. The available publications are more or less meant for the informed folks, companies, financial groups and the like. The publications of the Indian Financial Corporations, the Planning Commission, the Indian Investment Centre and the N.I.D.C., as well as Kothari's Economic Guide for Investors, the Handbook of India and the Stock Exchange's Official Director (Domestic), are very useful, but not developed to the point to serve all potential investors. These publications are not as widely used as the popular brochures and manuals, and are not meant to teach or to invite action from large circles of laymen or professionals, existing or potential entrepreneurs.

2. In India, the investment policy is regulated by laws and decrees, as well as by the day-to-day decisions or loans, licences etc issued by the Central or State Governments, financial corporations and other bodies concerned with investment policy and execution (Planning Commission, State Industrial Corporations, industrial boards and committees). The above information must be available for the entire public, including potential and fit re investors, and the supporters of the projects on a regional or other basis (e.g. communities and business circles, groups of different interests, investors from the agricultural community). The investment must become the interest and "property" of a wide circle of people taking in the farmers, workers, businessmen, companies, government and community bodies and institutions. To develop and utilize the interest in the right direction, handbooks and manuals should be used to reach the more active participants in the above enterprises. India is a huge country and the information on laws and ways of investments does not reach very far. In a more developed country, the information reaches the entire public. A book sometimes has a greater impact on the behaviour of the public and the entrepreneurs than the daily newspaper and advertisements do. Above all, India is a country with a mixed economy, and correspondingly more problems in the application of various techniques. A goal is to develop all possible investment

## Informational

Criteria

tendencies. The manuals and handbooks should play a positive role in order to realize this aim. In addition, various additional forms of information may exist for investment purposes. In a particular, publications in several periods.

• Present titles must be thought over again to reflect detailed content of the document, its main features and its specific interest. Information of this kind is significant for the time needed for the investment project.

### Investment Information and Information Criteria

1. Information must be given on the existing types and subjects, financial and investment policies, central and local, and to provide general overall parameters and criteria for investment in all branches of the industry and other secondary activities.
2. This should be followed by data for current branches of industries with regard to their specific requirements in investment prerequisites and potentialities, specific financial parameters, criteria and more details on investment terms, cost/benefit ratio and output, and on the cost of operations.
3. Additional materials should be written for the industries dealing with detailed information on regional circumstances, environments, and possibilities for investment. These are: parameters and techniques and economic criteria (in physical and financial terms) of the enterprises.
4. All documents must present assistance and encouragement in order to stimulate undertakings for all concerned. It must encourage a deeper understanding of investment and the consequent effects on the development of the country's material base, and later on the standard of living and on human development. It must also induce a scientific approach and an understanding of the methods of computing parameters and areas of productivity of the specific investment undertaking.

## Investment - a theme of the 70's

### Part I. Investment and the 70's - a theme of investment

#### Chapter 1. General concept of investment

- (a) Definition of investment, the main forms of investment, its results
  - Kinds of investment
- (b) Distinction by type of investment - economic development, economic infrastructure, agriculture, industry, trade, services, social welfare, culture
  - Distinction by function - creation of economic structures, health, culture, education, welfare
- (c) Technical structures - building, assembly of equipment, assembly of equipment, preparation of instruments, measurement stations, liquid pipelines, etc.
- (d) Types of investments - industrial, agricultural, mining, power, main and auxiliary works, construction and auxiliary facilities
- (e) Concept of the investor
  - Description of the different types of investors - private, public, corporate and individual
  - How to become an investor
- (f) The object of investment - small-scale, medium and large-scale industries, plants, factories and industrial complexes

#### Chapter 2. Legislative regulation of investments

- (a) Investment policy and needs of the country
- (b) Legislative regulation favorable for investment
- (c) Freedom of investment
- (d) Bodies and authorities assisting investors

#### Chapter 3. Prerequisites for investment and getting money

- (a) Studies and investigations - the feasibility report and its main features and purposes
- (b) Decision-making and project report
- (c) Initial investment and running-in period (realizing full capacity of production)

#### Chapter 4. Financing of investment (financial problems and solutions)

- (a) Ways and means of getting money
- (b) Credits and loans from banks or financial corporations
- (c) Foreign exchange, computation, applications and sanctions

United Nations

1970

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and the development of new technologies in the field of production.

Technology transfer

is a very important factor

in the development of production, especially in the field of production

of high-tech products and equipment.

Technology transfer is a process of exchange of experience, knowledge, and

information between countries, organizations, and individuals. It is aimed at the transfer of scientific and technical knowledge, skills, and experience from one country or organization to another. Technology transfer can be achieved through various means, such as joint ventures, strategic alliances, technology licensing, and research collaborations. It can also be achieved through the transfer of management practices, operational procedures, and best practices. Technology transfer is a critical factor in the development of production, especially in the field of high-tech products and equipment. It is also a key factor in the development of new technologies in the field of production. Technology transfer is a process of exchange of experience, knowledge, and information between countries, organizations, and individuals. It is aimed at the transfer of scientific and technical knowledge, skills, and experience from one country or organization to another. Technology transfer can be achieved through various means, such as joint ventures, strategic alliances, technology licensing, and research collaborations. It can also be achieved through the transfer of management practices, operational procedures, and best practices. Technology transfer is a critical factor in the development of production, especially in the field of high-tech products and equipment. It is also a key factor in the development of new technologies in the field of production.

## Chapter 1. Investment in production facilities

Investment in production facilities is a critical factor in the development of production.

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## Part II. Parameters and criteria

9. Investment in the field of production facilities is the attempt at investment. The attempt to add to the investment in the field of production to develop the production facilities in a particular country, and to provide the input for investment. The investment in the field of production is aimed at the development of economy and not an investment. Industrial processes are primarily governed by the profit factor and the plan. This is the task of scientific research to answer: why, how and what to invest money. The answer may be assisted by parameters and criteria which are the results of given achievements and levels of development in a particular country and in the world. Combining internal and world parameters and criteria, and comparing them with developed countries, will help in making decisions on investment with respect to specific production or a field of economy.

1.1.1.  
1.1.2.  
1.1.3.

1.1. The parameters of investment in plant and equipment are:  
- material types, and the rate of depreciation of fixed assets; the size  
of fixed assets; and there are already a number of defined parameters, and  
the importance of which depends on the size of investment. The type and  
number of parameters are as follows:

#### Chapter 1. Parameters and rates of investment

- (a) Norms of investment per unit of output by product
- (b) Input per unit of investment by product
- (c) Optimal investment approach
- (d) Structure of investment by product  
- type of investment  
- equipment  
- form
- (e) Investment per employee by product

#### Chapter 2. Parameters and criteria of investment

- (a) Norms of investment per unit of product
- (b) Input structure by investment  
Material input  
Depreciation  
Labour
- (c) Figures for companies in developing countries (developed countries)
- (d) Rates of depreciation (technical and economic)

1.1. The figures in this chapter should be the averages for the river countries and for the advanced countries. (The minimum should be employed in the present and maximum should be used as a goal.)

#### Chapter 3. Economic and complex parameters and criteria

- (a) Capital coefficients for branches and products
- (b) Structure of output and rate of surplus value or value added,  
and rate of accumulation (turnover or capital)
- (c) Structure of fixed and working capital
- (d) Turnover of working capital
- (e) Rentability, manufacturing return, profitability

#### Chapter 9. Other parameters and criteria

Under CH. I

Annex

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Part III. Appendices

Appendix A. This report - text and requirements

Appendix B. Description of the subject's presentation, engineering  
and scientific data

Appendix C. Summary of the results relating to investment, with an  
outline of the present situation in the production of ferrite  
ceramics

APPENDIX

ANNUAL REPORT TO THE CO-ORDINATOR

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A. General report of the co-ordinator	1
B. Report on the preparation of the new plan for project studies	1
C. Report on the feasibility study for the pulp and paper industry	12

A. GENERAL REPORT OF THE CO-ELIMINATOR

1. This report reviews those aspects of the work accomplished which could not be covered by the joint final report and gives an over-all account of the problems and achievements. During the two-and-a-half years of work along with seven United Nations experts, hundreds of local specialists, officials and executives within some ten organizations were engaged. There are piles of reports, notes, forms, correspondence and minutes of meetings giving evidence of the work done. But there are still hidden behind all that, problems dealt with and achievements made. This report wants to bring them to light and in doing so, it does not replace other reports on the project nor should this report be judged by its 1f.

Tasks and accomplishments

2. During the progress of the project and from other reports a number of tasks evolved. First, to bring to a successful end the work of two experts in the field for whom the preconditions were not favourable. The ferro-alloy expert had no count part; he had to put up with ~~delayed visits and~~ contacts with the sources of data. His assignment had to be extended for three months. The fibre-board study was not prepared and conditions in that industry were not favourable for doing new study with more than 50 per cent capacities idle. Adjustment of the scope and the methods of the study were necessary to meet that situation and to produce a useful report. The next problem was to clarify the situation of three incurred studies, pending at the time, and a fourth one could not be carried out because of lack of data. The third and most important task was to get follow-up work started from the very beginning by distributing the reports and by initiating discussions. The preparation of the new plan of studies was the fourth task, together with investigations into the new applications and the future work of the project.

3. The problems were mainly organizational ones, i.e. to get all participants to strengthen and intensify their concern and to co-ordinate the efforts of the experts and their counterparts to produce more fruitful results. But there were also the other specific problems connected with the technical and economic adjustment of investigations to current conditions, needs and recommendations. There was no abundance of means available for achieving the set tasks, but thanks to measures taken by sponsors and the

help rendered by Respondent's representative. The writer would like to add a few lines.

4. The plan for the work of the experts was to submit a report on the actions necessary and, in addition, suggest the organization of the documents required for improving the organization and methods of work.

5. The following tasks were accomplished:

- (a) The solution of indicated items. They were found to be necessary and therefore dropped.
- (b) The important study on pricing and payment, along with the expert, was transferred to the Economic Survey Board.
- (c) The experts in the field received a large number of contacts with institutions and their comments were collected.
- (d) The follow-up work on submitted reports, tables, discussions and comments invited from all parties concerned yielded good results, especially from the States.
- (e) Intensive work on the preparation of the new round studies together with State authorities, institutions and the private industries was carried out and the plan was accomplished and presented.
- (f) The newly prepared reports were reviewed and discussed in the presence of experts. This was one of the most positive results achieved. The follow-up process started with the experts still in the field, who were able to explain and interpret their recommendations. That was the reason why the last two reports can now be considered as most promising for implementation.
- (g) With the comments and observations on first five reports, the meeting for evaluation has been prepared and convened, but this was not finalized.
- (h) The experts and the Co-ordinator provided each experts systematically with knowledge and experience in order to enable them to carry out studies independently.
- (i) Reports and reviews of the project work were issued systematically and regularly, and some principal questions about the organization of the project work were discussed and agreed upon.
- (j) The intensive work on follow-up has reached the stage of examination of possibilities for implementation. Some of the reports have been made use of. Contacts with the experts were established and valuable suggestions were received.
- (k) The field personnel of the project made valuable contributions to other United Nations projects and/or Indian studies (export promotion, T.A. projects, techno-economic surveys and the like).
- (l) The experts and the Co-ordinator received a number of requests to consider and to assist in various projects and studies. The demand for the projects and for the experts has been steadily growing.

- The first point concerns the potentialities for the development of the short-term financial markets. It is necessary to emphasize again that the adequacy of the short-term financial markets will depend on the avoidance of the factors which may inhibit the investment and channelling in the performance of the economy by the financial specialists with adequate background for the responsibility (except, maybe, in one case). They were, of course, primarily technicians, less concerned with economic problems. This does not mean that their orientation in the world was suitable experts for those specific kinds of study and for experienced in making feasibility studies in a developing country.
- The second point concerns the potentialities for the development of the long-term financial markets. It is necessary to emphasize again that the adequacy of the long-term financial markets will depend on the avoidance of the factors which may inhibit the investment and channelling in the performance of the economy by the financial specialists with adequate background for the responsibility (except, maybe, in one case).

#### Experiments and experience

• The third point concerns the possibility for the development of the short and the long-term financial markets. It is necessary to emphasize again that the adequacy of the short-term and the long-term financial markets will depend on the avoidance of the factors which may inhibit the investment and channelling in the performance of the economy by the financial specialists with adequate background for the responsibility (except, maybe, in one case). They were, of course, primarily technicians, less concerned with economic problems. This does not mean that their orientation in the world was suitable experts for those specific kinds of study and for experienced in making feasibility studies in a developing country.

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### Project Objectives

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### Conclusion

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### **• open-mindedness and comprehension**

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• The following is a brief account of the work done by the Co-ordination Committee and the Institute of Technology, Madras, in the field of heavy engineering during the period 1969-70.

The Co-ordination Committee has been functioning since 1967-68. It consists of the Director of the Institute of Technology, Madras, and the Director of the Regional Research Laboratory, Karaikudi, and the Chairman of the State Planning Board. The Co-ordination Committee has been instrumental in the preparation of the following reports:

(a) The feasibility study for setting up of a large-scale integrated textile machinery plant in the State which will be based on the available knowledge and experience in the State and the rest of the country.

- (b) The feasibility study for putting up a unit of integrated textile machinery which can be used in the production of cotton and jute fabrics for the use of the existing spinning units in the State.
- (c) The feasibility study for developing a unit of petrochemical plant equipment for the manufacture of filament in the State which can be the most suitable in the country.
- (d) The study for putting up the integrated facilities of petrochemical plant equipment and methanol. The production of crude oil in India is increasing and is now second largest in the world. The present part of petrochemical plant equipment is imported while the design of the engineering industry is idle due to lack of designs. The last fact is generally recognized in India.
- (e) At the meeting convened to evaluate earlier submitted reports, the plan was questioned. The Co-ordination and the Institute have submitted further background explanations. In the meantime, one of the existing design organizations has been entrusted with the responsibility of developing the expertise for the design of petrochemical plant equipment (they feel the need for technical assistance to carry out this work) and a large company has prepared a plan for putting up a huge complex for recovering sea-water chemicals (in collaboration with foreign company). Thus, the plan is being executed in some way or other.

### Conclusion and recommendations

44. The equipment for the studies of this project continued to exist and new experiments were made, some of which are the result of findings and recommendations of the submitted reports.

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THE PAPER AND PULP INDUSTRY  
PROSPECTS FOR THE STATE OF JAMMU AND KASHMIR

39. The paper and pulp industry in India is at a very low level. It was felt that the market potential in India is very large and there is a great opportunity for expansion of the industry in the future. However, India has a long way to go before it can compete with countries that have had a long history of paper production. The **Sister** study was asked to look into the paper and pulp industry in India which falls into the category of a developing country. It was felt from the funds available that the paper and pulp industry in India has achieved some measure of success, but there is still much to be done. The report on the paper and pulp industry in India was made available, and it was recommended that the government be asked that this study be continued and further support rendered. It was also recommended that the government, upon receipt of the absence of the paper and pulp industry.

Industry, industrial and investment policy

40. Market availability of cellulose fiber for paper and newsprint were elaborated. It was stressed that in India paper and newsprint are costly due to the price of the raw material and the production process which is more expensive than that of countries which use beaters. The consumption of paper in India is very low, or just **1.5 kgs per capita per year**. The characteristic feature of existing pulp and paper production in India is that plants are of a small size except from the fact that production as a whole is very low. With one exception, all plants are integrated mills.

41. The raw material available in Jammu and Kashmir is one of the best for pulp and paper, but the accessibility of forests differs in the individual provinces. There are enough fir species for the pulp mill (100 t/day) in Kashmir and for the newsprint plant of 200 t/day in Jammu. The demand of other consumers can be met, including a reasonable increase in the future. Product mix was selected taking into account that from Kashmir it is not feasible to transport easily great quantities, therefore rayon grade pulp was suggested. For Jammu, the production of newsprint was suggested because of better transport conditions and the high demand for newsprint (a large portion of newsprint is still imported).

### Riven Grade and its Future

42. Selection of the process was extremely difficult because many were made for one producing strong fibre which is called "superior" card. This process would ensure the reduction of production costs. If the size of plant to be built is not determined, it might be contemplated. Additional comment will be made when discussed and presented by rehometry by. Report on rehometry and production costs have also been made. Capital investment required is Rs.113,000,000, while production cost of riven grade was estimated at Rs.1.40 per ton including raw material. Cost of riven grade pulp, was about Rs.1.10 per ton (at the time the feasibility study was compiled). Some possibilities for increasing the size of production were described. Lower production costs can be achieved if wood (at present 44 per cent of the total production cost) goes down and other savings are made in raw-material consumption. It was found that other facilities, like water, coal (shipped from Bihar at the high rates), were available. The economic feasibility was not assessed.

### Newsprint in Jammu

43. The erection of a newsprint plant of 200 tons a day was suggested because the proximity to railhead holds prospects for the manufacture of a more bulky product for which demand is high. The kinds of timber available were highly auspicious for newsprint. The consumption of pulp (chemical and mechanical) would require a minimum plant size of 200 tons a day (because a smaller chemical pulp plant would not be economical for the recovery of chemicals which constitute a very important item in factor costs). The capacity can be expanded in future in accordance with availability of fibrous material.

44. The suggested location of mill is Ravi which is considered most suitable from the point of view of cost and transport (transport of wood down the river Chenab and from neighbouring Himachal Pradesh). Other suitable sites were elaborated but final decision on optimal location should be taken during the follow-up work. The technological process was extensively elaborated and demand for chemicals, coal energy, water and other facilities calculated.

3. A feasibility report was submitted on 18. 10. 1960, concerning the proposed project which has been sent over to be implemented. The original proposal was for Rs. 8,000,000/- and interest on capital and working capital were estimated at Rs. 1,17,00,000/- per annum. The total cost of the project was Rs. 9,17,00,000/- and less than 50% of the total amount had been spent so far. It was suggested that the project should be continued and the remaining amount will be spent in the next financial year, i.e. 1961-62.
4. The project was submitted to the Finance Committee of the Legislative Assembly of Jammu and Kashmir. It was concluded that the cost of the project was too high, the amount to be spent on the project should be reduced proportionately with all commodities of production being cut down, and the project stopped. For the country, the value of the timber available for exploitation of available resources was far more than present. However, a good deal of timber must be felled to obtain a large quantity, transport etc. and so forth. While Jammu and Kashmir has a lot of forest resources available, even if rates are higher, it would be worthwhile to exploit these resources fully. It was suggested that we start with the first 100000 cubic meters and add at possibly 100000 cubic meters every year.
5. The expert visited Jammu and the Inspector General for Forestry found the report to be useful and useful in considering the needs of wood. State authorities are advised to use it to their advantage in their negotiations with foreign countries for supplies of raw material.
6. The expert has been incorporated in the requirements of a feasibility report. The expert has taken every care to reflect it and to give proper formulations, modifying some suggestions in previous reports, especially with regard to figures, technical standards and process of selection. In this way having direct contacts with the relevant institutes, production units and industries of equipment, the expert has conveyed suggestions, knowledge and experience which is beneficial for the whole country. So the result of this study will be considerably even if at the moment there are no possibilities for implementation of new plants in Jammu and Kashmir.
7. It is necessary to understand the industrious efforts of the expert and his goodwill to do his best under unfavourable conditions and in the absence of counter part (technologist) and of economists to calculate more alternatives.

It is necessary to acknowledge the services of the valuable assistance of Mr. F. D. Straney, Senior Consultant of UNAEC (Pakistan).

The next task of the expert

50. The FAO project on forest resources and industrial utilization required to have experts for utilization in the term of the second study survey. When the FAO representatives were dealing with the project for which they were sent and assigned to carry out the feasibility study (centralized and decentralized) the Resident Representative and Co-ordinator in India suggested that the expert transferred to that project and in that way the main assignment of that project was accomplished. Negotiations were successful and finally the expert is now engaged for two years in three project stations (in three regions).

51. In this way co-operation between United Nations agencies was enhanced. The expert of this project was able to help the FAO project completed and to speed up some of the work (cost test, information collection) and acted later as a consultant.

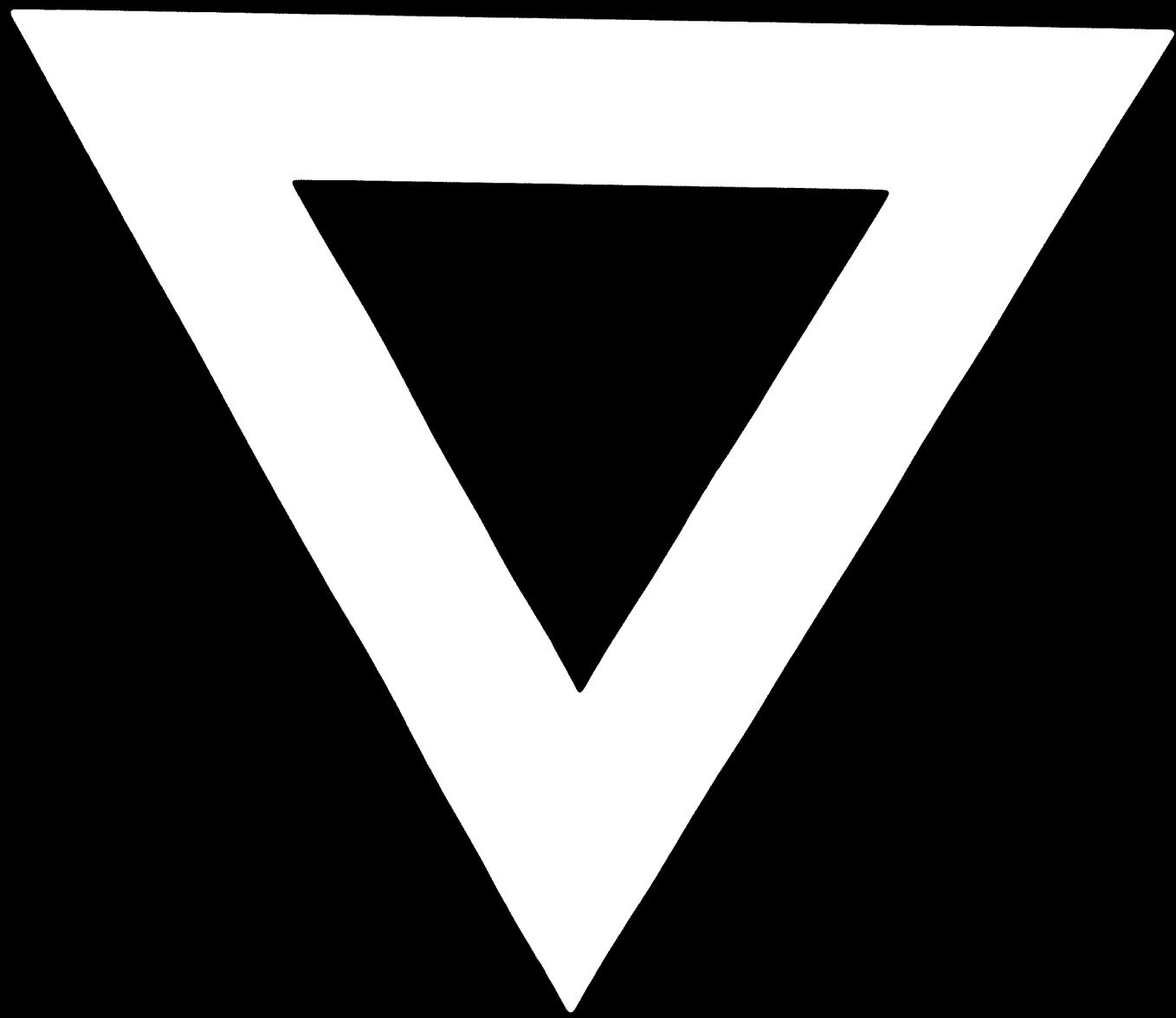
Conclusions and recommendations

52. The accomplishment of this study has rendered valuable contribution to investigation work in India, the significance of which cannot be over-emphasized.

53. Some additional investigations are necessary such as economic feasibility, analysis of national profitability, cost benefit analysis (especially with regard to the sensitivity of rayon grade pulp and cellulose of textile mills due to shortage of raw material).

54. The transfer of expert and the taking up of the former important assignment of this project was valuable for the industrial development in India, and for the co-operation and co-ordination between United Nations agencies.

55. The question of improved co-operation and co-ordination between United Nations agencies should be considered.



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