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List of annex figures

"The Government [illegible]
industry [illegible]
for [illegible] industry [illegible]
by the Nat[illegible]
been prepared [illegible]
the data [illegible]
for preliminary [illegible]
technical and economic [illegible]
required for decision-making [illegible]
as well as specific information [illegible]
suitable technology and process equipment, [illegible]
ties specifications. United Nations expert [illegible]
forest-based industries and mineral-based industries [illegible]
Pradesh and Mysore has been agreed [illegible] project could be extended to other States and areas [illegible]
tion was that the reports should be authoritative and comprehensive enough
to serve as basis for consideration by investors [illegible] participation

2. The preparatory work and discussions [illegible] commenced in January 1965 when Mr. Miller, United Nations Senior Technical Consultant, came to India and began the work of final preparation for pilot studies for the selection of subjects for examination. The NIDC was chosen as the institutional base for the counterpart work at the Centre, whose 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
- Welded steel pipes
- Aluminium
- Plate glass
- Silicon carbide and abrasive tools
- Foundry pig iron
- Refractories
- Pelletising plant
- Pulp and paper
- Fibre-boards
- Saw-mills

[illegible]

[illegible]

[illegible]

Flat [illegible]

[illegible] paper

[illegible] [illegible]

[illegible]

Structural steel fabricating plant

Central pulp plant

It [illegible] projects may also be [illegible]:

[illegible] } [illegible] Madhya Pradesh and Mysore

[illegible]

4. 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.

The Conditions and Problems

5. At the beginning of the project work, [illegible] favourable. The States were [illegible] prospective industrial development with the [illegible] ment. The United Nations Development Programme [illegible] appointed a senior consultant as project leader, the [illegible] the sponsor organization was [illegible] with very [illegible] power, the institutional basis institute - NCDR - was [illegible] highly esteemed organization with experience in technical [illegible] surveys and finally there were promises by the States concerned with the NCDR 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

[illegible]

[illegible]

[illegible]

[illegible] reports; a consolidated report on the [illegible] reports giving account of the [illegible] experts in assisting the [illegible] respective lines of industries;

[illegible] annexes to the consolidated report which include: summaries of the reports and supplementary information furnished after the completion of the reports; a review of the background and organization of the project work; a guide for the organization and procedure of such projects; guidelines 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).

[illegible]

[illegible] was very [illegible] or others [illegible] India or elsewhere [illegible] appreciation of the [illegible] special acknowledgement [illegible] from Mr Ramalingam and Miss [illegible] NCAER and [illegible] for the [illegible] from Mr P[illegible] secretarial work. Mr Balkrishna from Planning [illegible] deal of trouble and helped very much in the [illegible] of the reports.

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

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Para-[illegible]

24 Recommendation [illegible] the [illegible] the matter [illegible] boards with [illegible] implement this Recommendation, it is necessary [illegible] demand for Plywood in the country. Experience [illegible] show that there is a considerable increase in the production and consumption [illegible] If export promotion is taken up, the recommendation [illegible] implement

[illegible]

[illegible]

[illegible] engineering goods [illegible] indigenous skills [illegible] in new products [illegible] The performance is based on the good [illegible] deposits, [illegible] of electricity (which is an important product [illegible]) and an experienced manpower

[illegible]

[illegible]

[illegible] forest [illegible] Hard-to-[illegible] [illegible] Plywood [illegible]

[illegible]

[illegible] production of [illegible] and export [illegible] and southern and western [illegible] and further develop- [illegible] in order to satisfy local [illegible] existing plant at [illegible]

[illegible]

[illegible]

[illegible] suggestions, information- [illegible] find out the possibilities [illegible] assist the implementation of [illegible] development of the [illegible] proposed [illegible]

(a) Surveys [illegible] raw materials;

(b) Investigations on infrastructures and other supporting facilities (energy, water, [illegible] materials and the like);

(c) Measures for improving raw material resources;

(d) Studies on market availability and export potentialities;

(e) Investigations on the utilization of by-products and the setting up of by-product-based industries;

[illegible] industries;

[illegible]

[illegible]

[illegible] for Steel [illegible]:

[illegible]

(a) [illegible] and [illegible];

(b) Investigate the [illegible] as high [illegible];

(c) Investigate the [illegible] mainly high [illegible] and [illegible];

(d) Study the [illegible] abroad

Foundry pig iron

(a) Secure information on the production of foundry [illegible] the production of steel;

(b) Secure information on use of foundry [illegible] products.

Ferro-alloy

(a) Conduct [illegible] study on manganese ore in Andhra Pradesh;

(b) Utilise the waste and lump manganese ore in Madhya Pradesh;

(c) Study beneficiation and up-grading of chromite ore in Mysore;

(d) Construct a pilot furnace in Bhadravati for pilot [illegible] ferro-alloys;

(e) Investigate production of low-carbon ferro-manganese 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.

[illegible]

[illegible] consumption in [illegible] work, furniture);

[illegible] costs [illegible];

[illegible] and imported [illegible] internal consumption;

(d) [illegible] production of [illegible];

(e) [illegible] industry

[illegible]

[illegible]

[illegible]

34. Almost all the reports include suggestions for and information on operation practices and the improvement of the existing industries in the relevant fields. The reports on aluminium, pig iron, ferro-alloy, and pulp and paper comprise observations on 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 checking up 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 ferro-alloy and aluminium reports).

II. ANALYSIS OF POSSIBLE RESULTS AFTER IMPLEMENTATION

35. To support the sound 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 implementators: 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 [illegible] and planned [illegible] in [illegible]

[illegible]

[illegible]
(in thousands of [illegible])

Product	[illegible]	[illegible]	[illegible]	[illegible]
Aluminium metal	[illegible]	[illegible]		[illegible]
Pig iron (foundry) after 1970/71	[illegible]	[illegible]		[illegible] a/
Ferro-chrome	[illegible]	small [illegible]	[illegible] available	[illegible] available
Silico-manganese	[illegible]	[illegible]	[illegible] available	[illegible] available
Electrolytic-manganese	-	[illegible]	[illegible] available	[illegible] available
Coke of non-coking coal	40 ([illegible] coal)	[illegible] available	[illegible] available	[illegible] available
Pulp and paper	[illegible] b/	[illegible] (paper)	[illegible]	[illegible]
Hard-board	[illegible]	[illegible] 50 capacity [illegible] production	[illegible] available	[illegible] available
Structural steel	30	300	[illegible]	[illegible]
Steel pipes and tubes	20 (M.P.) 38 (Mysore)	[illegible]41	[illegible]	1500

a/ Pig iron for sale taken as the existing and planned production

b/ 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);

(a) [illegible] recommended capacities suit the present large-scale production which promises a better economic and technical efficiency of industrial activity in India and which [illegible] the prerequisites for the current stage of India's development;

(b) it is feasible to realize the recommendations on production [illegible] of certain products (pulp and paper, aluminium, [illegible], foundry pig iron, soft coke, steel materials and steel pipes) on basis of domestic experience and available know-how and technical skill in existing production;

(c) the recommendations for the other two products are feasible to be taken up after some additional tests have been carried out by the technical staff existing in the field (silicon-[illegible] and ferro-chrome);

(d) [illegible] project (electrolytic manganese) foreign aid and assistance in know-how will be [illegible] to start production (some research work has already been done or is in progress in the country).

38. Most of the recommended products 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 structurals, steel pipes, ferro-alloys, foundry pig iron and finished aluminium goods), and the export promotion drive will also be affected. The recommended products (aluminium, steel pipes, fibre-board, pulp and paper) will help to increase the standard of living.

39. From the point of view of increased utilization of domestic resources (material and human), the importance of implementing recommended production cannot be over-emphasized.

40. Implementing production involves the import of auxiliary material in a 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 fabricating etc.), for changing the product-mix to meet varying marketing 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 1970/71 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.

48. The [illegible] generally recommended give opportunities for employment in [illegible] industries and in the field of raw materials (bauxite mining, wood extraction, [illegible]). The implementation of recommended projects will result in new employment in processing industries and construction work. Therefore, the multiplying effect of employment would be considerable. [illegible] benefits for the provision of employment in the country.

49. The [illegible] industries [illegible] employment opportunities for all types of [illegible], particularly for the semi-skilled and unskilled who could be trained from [illegible]. The latter type of employment is particularly important in the [illegible] where under-employment is considerable (Bastar District and [illegible] in Mysore). The productivity of [illegible] will be very high, especially in aluminium; in steel structurals [illegible] per cent increase in productivity is contemplated compared with the existing conditions in the country.

49. 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 suggestions 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).

[illegible]

[illegible]

Product	[illegible]	[illegible]
Aluminium ([illegible])	[illegible]	[illegible]
Pig iron (pelletizing plant [illegible])	[illegible]	-
Ferro-chrome		[illegible]
Silico-manganese	-	-
Electrolytic-manganese	-	-
Coke from non-coking coal	[illegible]	[illegible]
Pulp and paper (rice straw paper 66,000 million tons)	[illegible] b/	[illegible]
Hard-board	[illegible] ([illegible] 1,000 tons)	[illegible]
Structural steel	14 (domestic supply)	[illegible] (foreign supply)
Steel pipes	14 (Mysore) [illegible] (M.P.)	[illegible] million pipes

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

[illegible] fibre-board, [illegible] Naturally, [illegible] of townships, [illegible]

[illegible] existing in the country [illegible] production for which [illegible] it is well [illegible] depends on the [illegible]

[illegible] facilities, [illegible] and the like are given wholly [illegible] this aspect is [illegible] of water is not elaborated. These [illegible] carefully before making a decision on [illegible]

[illegible] of the recommended investments into phases [illegible] reports in greater detail where there is [illegible] demand for the product - aluminium, ferro-alloy, steel structures fabrication, fibre-board and pulp and paper and so on.) The [illegible] is expected in line. This has to be elaborated in project reports more precisely. It is a very important point in the sequence of investment. A financing plan of investment is given by the schedule only in the fibre-board report.

56. The [illegible] component of investment has not been elaborated except in two cases, mostly owing to lack of criteria and data. In some cases such an elaboration was not relevant.

57. 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.

58. In developed countries, the structure of investments i[illegible]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

[illegible]

[illegible] and equipment [illegible] insufficient [illegible] project reports for [illegible] exchange or investment savings.

60. Investment estimates [illegible] the report on aluminium. In the report [illegible] investment is discussed with respect to [illegible] investment for an expansion [illegible] existing [illegible] paper. The other investments are recommended [illegible] Nailadilla, straw paper in Bilaspur, fibre- [illegible] in the vicinity of Bhilai and so on.) The requirements for [illegible] infrastructure and other facilities are listed [illegible] However, the list of requirements as this given in some reports is [illegible] for calculating more accurately in the present report [illegible]

Supply of equipment

61. 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.

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

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] complete. It should be stressed that the more the reports [illegible] the problems are faced and explained, the [illegible] ability and opportunity to [illegible] the above [illegible]. In this respect the report on [illegible] is very good, [illegible] the principal practical factors responsible [illegible] more pertinent information [illegible] than was expected by [illegible] data and information about the [illegible] raw materials and their possible [illegible] factors in that industry.

70. The report on [illegible] has also attached and elaborated many of plans of production and investment which are ready [illegible] for the specialist in the field.

71. In the other reports, there is enough information and synthetic proposals to learn much about the various industries, and to continue the investigations along the same lines.

VII. [illegible]

72. For all of the examined industrial objects, technological processes are available which are applicable to the technological properties of raw materials and it is possible to select the appropriate technology to suit the technological and economical requirements for efficient work. Moreover, for

[illegible]

[illegible] tions, [illegible] to [illegible] and the [illegible] of average quality [illegible] to achieve optimum [illegible] and [illegible] manganese, [illegible] ore, bauxite [illegible] materials)

75. The technical [illegible] properties [illegible] materials and the applicability of technologies has not been proved by [illegible] and pilot plant tests for all deposits and grades. The limitations caused by insufficient data and [illegible]

[illegible] machinery pr-

[illegible] production [illegible]

[illegible] aluminium [illegible]

[illegible] exports against

[illegible] exhibition

[illegible] legislation

[illegible] minimum, [illegible]

[illegible] of [illegible]

[illegible] typical

[illegible]

[illegible] pr-

[illegible] improve the

[illegible] for part in

[illegible] structural steel. The productivity

[illegible] industries (in some reports

[illegible] the suggestions are still satisfactory and pro-

[illegible] competitive [illegible]

[illegible] report, [illegible] this

[illegible] reports there are

[illegible] techniques.

[illegible] recommended pr-

[illegible] extent of [illegible]

[illegible] country. This is

[illegible] some cases, pure-

[illegible] still those in

[illegible] production which is usually lower than

[illegible], aluminium, pig iron, pulp and paper). In

[illegible] improved (ferro-alloy, stress-

[illegible]), [illegible] for improvement of the operational

[illegible] technique [illegible]. That is necessary for the large-

[illegible] production [illegible], structural steel, pulp and paper) and

[illegible] of [illegible] other industries (ferro-alloy, fibre-board).

[illegible] reports are not [illegible] of the Indian counterparts abroad (fibre-

board, [illegible]), and/or [illegible] the resistance of foreign experts and

[illegible] structural steel, fibre-[illegible], aluminium, [illegible] magnet [illegible] their [illegible] which [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] economy of the [illegible] [illegible] [illegible].

[illegible] The [illegible] availability of know-how [illegible] aluminium industry. [illegible] when [illegible] consuming and [illegible] supplementing [illegible] suggested products, know-how in the consuming industries [illegible] sufficiently developed: aluminium, fibre-board, [illegible] silico-manganese [illegible] although these are [illegible] in small quantities. The lack of know-how hampers particular measures which must be undertaken to ensure the best utilization of products and more economical [illegible] production. The aim is [illegible] higher-quality product or higher level of utilization.

41. The use of aluminium is [illegible] the [illegible] ability of the country to produce it. The aluminium industry is a particularly developed industry. A question comes from Madhya Pradesh: will the steel industry accept silico-manganese? This proves that know-how is not available in the consuming industry, since that product is gaining more of a place in the structure of ferro-alloy consumption in the world.

42. 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;

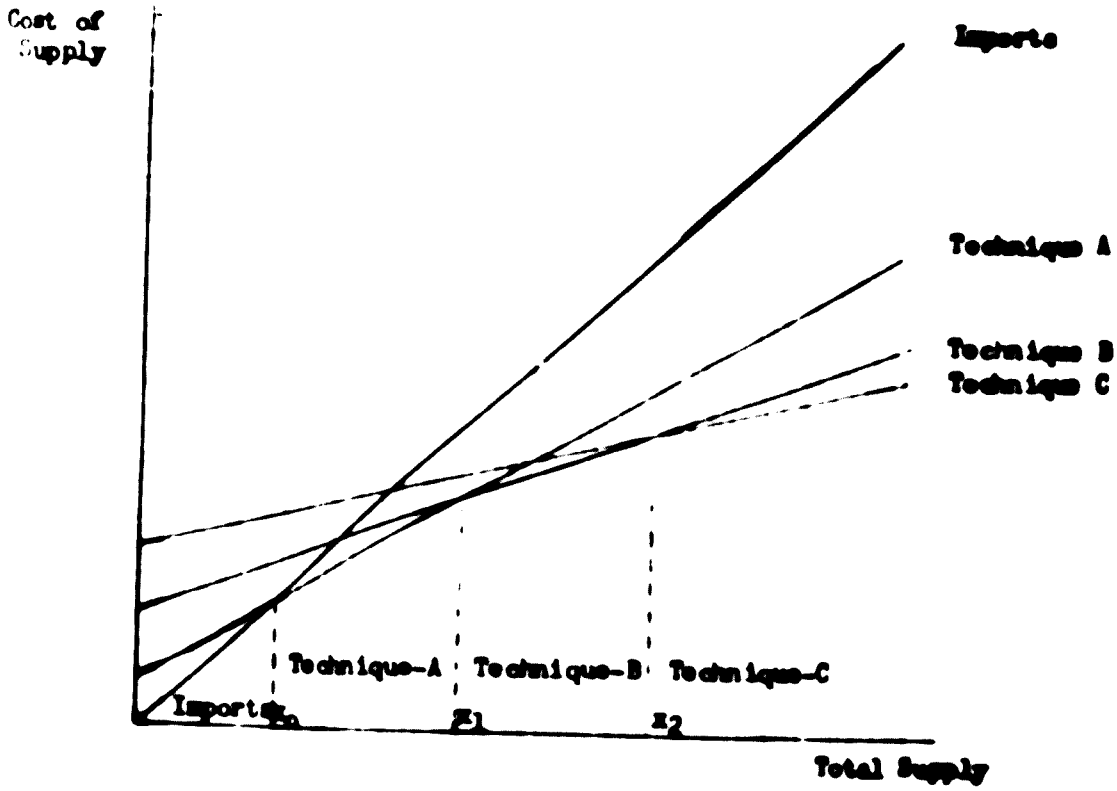
(c) industries for maintenance;

(d) consuming industries and

(e) industries for construction work.

Figure 1

Choice of technique



Sources: United Nations Development Programme Technical Series No. 2 - Formulating Industrial Development Programme and Report of the Second Group of Experts - ESAFE - 1961, 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 individual economic feasibility. This is particularly important in local plant countries with which it is not an easy thing to do.

84. The analysis of economic feasibility is a report in which indicate consideration because of the uncertainty cause by the different sources and availability of data, and because of the distinct or for different locations, suppliers or prices and the trend in market behavior. The impact of world market prices, national economic policy (e.g. taxes, duties, interest rate policy, monetary policy on inflation) and labor 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 consuming industries, in order to prove economic feasibility not only in comparison with the prices of a given product, but also in its consumption profitability.

8. The economic results of implementation for the State or for the whole country should be the part of this economic feasibility analysis. The shares of net output for the State and the increase of savings increase should also be analysed, as they are useful to supplement the standard economic indicators for financial corporations and other investors discuss the report.

Indicators of economic feasibility

9. The production cost or price per unit has been computed or estimated in all reports, either in gross or net terms. The costs are lower than those now existing in the country (aluminium, structural steel, fibre-board and other products where the data is less complete) but are above the proposed or present production costs.

10. 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 others could 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 implementation since the computation of the cost 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 consuming 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 computated 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 utilisation 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 utilisation and so on).

Table 3

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

Product	Cost per unit	Existing cost	World price	Profitability
Aluminium metal	2400-3000	4000-5000	[illegible]	3-1[illegible]% gross
Alumina	335- 466	500- [illegible]	[illegible]	
Pig iron (foundry)	[illegible]	[illegible]	[illegible]	[illegible] rupees per ton gross profit
Ferro-chrome	-	Not available	Not available	-
Silico-manganese	-	Not available	Not available	-
Electrolytic-manganese	-	-	-	-
Coke of non-coking coal	30	91 a/	-	Saving 11% per ton
Pulp and paper-rice straw paper	680	1500 b/	-	[illegible]% gross profit on investment
Hard-board	528	1000	610 c/	-
Structural steel	1334-2226 (average 1845)	-	1755 d/	5.4 to 9.5% return 103 rupees per ton - 10% of production cost
Steel pipes	-	1190	Not available	1[illegible]% 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)

[illegible] The [illegible] impact of high transport charges is very evident. The pro[illegible] [illegible] (for fire-brick and [illegible] per cent of the world market price [illegible] freight charges.)

[illegible] The structure of the price or production cost is elaborated in some reports (e.g. [illegible] aluminium, ferro-alloys, low-temperature coke), in others [illegible] [illegible]. In some cases, some of the factor costs are assumed on overall prices or normal participation.

[illegible] The report calculation of cost structure is lacking in few cases, but critical analysis of variable or capital interest costs is not offered. This [illegible] providing an improved critical analysis of the structure of production costs (principal [illegible] of variable alternate decisions [illegible] capital investment [illegible], the building up of auxiliary units [illegible], or the selection of technology and techniques, scale of production, [illegible] domestic supply of auxiliary materials and instruments, and so forth. It would also lead to seeking alternate uses of main raw materials and techniques (quality of bauxite ore, welding or rivet method, soft coke or charcoal, pre-baked or Soderberg electrode for aluminium, wet or dry method for ferro-alloys and others).

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 least 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 likes. (Pig iron gross profit 66 rupees per ton; 11.32 rupees, savings using soft coke for ferro-alloys; 9 per cent return on structural steel, [illegible] 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 indicated [illegible] of aluminium, and implicitly when given in the absolute figures in their reports. While this indicator indicates the complexity of production [illegible] human resources, it should be calculated as precisely as possible, [illegible] prevailing circumstances and future improvements [illegible] and supply, productivity and market capability, the [illegible]

97 The final indicator is that of capital-output ratio [illegible] ratio, input-output analysis, and profitability [illegible] 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, [illegible] of techniques, scale of production, application [illegible] or labour intensive industries, site selection etc., it should be computed and analysed. What of the output per unit of input of capital is, of course, desirable up to the maximum possibilities with the chosen techniques. There are many methods to compute savings and to discover [illegible] maximizing it with the chosen techniques.

98 The economic feasibility of different locations is [illegible] in the aluminium report. The calculations of different micro and macro locations on production costs are useful and will disclose differences [illegible] 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

[illegible] taken up without the use of computers, especially where the impact on various industries is considerable (power stations, grids, metallurgical complexes [illegible])

[illegible] The problems [illegible] considering some aspects of economic policy (tariffs, [illegible] subsidies etc.) were raised in some reports. This also has to be [illegible] carefully, since the existing policies [illegible] play positive roles in the development of some industries. On the other hand, it is possible that the [illegible] some of the economic instruments might reveal a better [illegible] of instruments and measures favorable for economic development and [illegible] expansion. This might also be the case when considering an export promotion [illegible] more profitable. This question has to be looked into and the necessary alternatives must be computed in order to find out the gain for the community.

[illegible] 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 [illegible] responsibility for reinvestment and the development of infrastructure [illegible]. The lack of the above, among others, is a factor responsible for the negative comments on the possibilities of implementation

PART TWO - FOLLOW-UP PROCESS

102 Before reviewing the follow-up process, it is necessary to [illegible] definition, purpose and prerequisites of this process

(a) The methods and organization of work from the [illegible] are important for a successful follow-up. This [illegible] stipulated in the Plan of Operations [illegible] of everyone should be properly defined

(b) The co-operation of those persons using the report is necessary for a successful follow-up

(c) In the course of the follow-up many errors or omissions of the report could be rectified and new areas of knowledge and experience should be gained which will [illegible] the implementation of the report and for future undertakings

103 Careful follow-up work has not taken place properly [illegible] circumstances have been improving in the latest stages, [illegible] results are not as expected

V. FOLLOW-UP ACTIONS

Results

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

105 Only one of the first five reports was discussed in draft form at minimum. This helped to discuss new alternatives with lower-grade raw materials (1 per cent of Al_2O_3 in bauxite). A discussions 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, DGTD and others), but a final evaluation was not made

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

[illegible]

[illegible] [illegible] agreed [illegible] and [illegible] the [illegible] supported [illegible] to these report [illegible] recommendations [illegible] implementation, along with the recommendations [illegible] the [illegible] power system and [illegible] in Madhya Pradesh, [illegible] the production of [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] reading the reports. The reports [illegible] However this is not sufficient to get the recommendations implemented [illegible] problems involved are more complex [illegible] without additional work [illegible] The reading [illegible] of the readers of the reports [illegible] handicapped [illegible] The absence of [illegible] reports [illegible] technically and economically feasible, they cannot be implemented [illegible] thorough investigation and economic analysis.

[illegible] There is one principal question: how can the reports be implemented in the given economic situation? This does not depend on the findings and recommendations in the reports, but on economic infrastructure [illegible] and the decision to invest.

[illegible] A thorough analysis of the findings and recommendations reveals that there is room for further study, not only in the technical and economic problems but also in the development problems in this country. In other words, there is a need to establish integrated production, but first many problems have [illegible]

VI. [redacted]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]

[illegible]

[illegible]

	Material input	Use per unit of product a/
	[illegible]	
[illegible]		[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
[illegible]		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1100
[illegible]		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

a/ Some of the input figures are not up-to-date, as in the case of electrical consumption for aluminum

[illegible]

[illegible]

[illegible] required for producing a [illegible]
(in rupees)

	[illegible] Steel strip-trees (per [illegible])	[illegible] Steel pipe (per [illegible])	[illegible] Hard-[illegible] (per [illegible])	[illegible] Ferro-[illegible] (per [illegible])
Total basic materials	[illegible]	[illegible]	[illegible]	[illegible]
Total chemicals and other auxiliary materials	[illegible]	[illegible]	[illegible]	[illegible]
Total fuel, electricity and lubricants	[illegible]	[illegible]	[illegible]	[illegible]
Total other materials (maintenance, repairs, packing) consumable stores	[illegible]	[illegible]	[illegible]	[illegible]
Total service used	[illegible]	[illegible]	[illegible]	[illegible]
Rent	[illegible]	-	-	-
Depreciation	[illegible]	[illegible]	[illegible]	[illegible]
Total value of material inputs	[illegible]	[illegible]	[illegible]	[illegible]
Value added by manufacture	[illegible]	[illegible]	[illegible]	[illegible]
Total labour or employment	[illegible]	[illegible]	[illegible]	[illegible]
Accumulation	[illegible]	[illegible]	[illegible]	[illegible]

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

PART THREE - APPRAISAL AND EVALUATION OF THE REPORTS

VII. EVALUATION OF THE SPECIFIC ASPECTS OF THE STUDIES

123. 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 any 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 counterparts and engineers. In event also the United Nations experts may feel free to make a comment.

124. National goals and policy 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 aluminium, 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. Very one of these projects offers the possibility of further development for a country. This can be proved by analysis of quantity and quality.

124. 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 utilise better the available natural resources. The impact of the implementation of the proposed industrial development on the changes 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 [illegible]

Technical coefficient comparisons between India and Yugoslavia

Product structure		Material	Depreciation	Labor	Accumulation
Manufacture of cocoa products	a)	[illegible]		[illegible]	[illegible]
	b)	[illegible]		[illegible]	[illegible]
Edible oil	a)	[illegible]		[illegible]	[illegible]
	b)	[illegible]		1	[illegible]
Fruits and vegetables canning		[illegible]		[illegible]	[illegible]
Iron and steel-ingots, rods, slabs, billets		[illegible]	[illegible]	[illegible]	[illegible]
Iron and steel -					
pig iron	a)	1			[illegible]
steel OHF, Bessemer	b)		[illegible]		
intermediate products rolled for structurals (heavy)	a)	[illegible]			[illegible]
Sanitaryware and whiteware, closets, wash basins	a)	1		[illegible]	1
	b)	1		[illegible]	
Plywood	a)	[illegible]	[illegible]	[illegible]	
	b)	1		[illegible]	1
Manufacture of paper and paper-board	a)	[illegible]	[illegible]		1
	b)	[illegible]		[illegible]	1
Rubber tires	a)	[illegible]		[illegible]	[illegible]
	b)	[illegible]	[illegible]		[illegible]
Rayon	a)	[illegible]	1		[illegible]
	b)	19	17	[illegible]	[illegible]
Cement	a)	69		[illegible]	1[illegible]
	b)	54		[illegible]	33
Internal combustion engines	a)	62	[illegible]	[illegible]	19
	b)	66	3		24

Source: Manual for Investors, published in Yugoslavia

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

VIII. RÉSUMÉ OF COMMENTS AND THEIR ANALYSIS

Specific [illegible]

Sources of comments

[illegible] Comments and suggestions were received from:

(a) State of Madhya Pradesh [illegible] on the five first reports[3] in terms of a short over-all evaluation and suggestions for improvements. For the last two reports[4], extensive comments are given with a series regarding enlargements and rectifications, errors and [illegible]

(b) Industry and Mineral [illegible] Ministries, as well as Directorate General of Technical Development, with respect to the first five reports, indicating impossibilities for implementation of recommendations and giving some suggestions regarding the information in the reports to follow. The last two reports were discussed at the meetings attended by the above-mentioned. The ferro-alloy report was discussed in its preliminary stage, and the aluminium report in its draft stage.

(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 only by the concerned enterprise. The Institute (NCMR), the institutional base for the project, has commented very briefly on four reports.

(d) United Nations agencies and bodies (UNIDO) have commented on some of the reports in their preliminary stages (outlines and drafts for pulp and paper, aluminium and fibre-board), and have commented indirectly on progress reports (ferro-alloy and fibre-board [illegible]), and have given comments on 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

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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 critically 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 short-comings of the reports.

Disagreements

129. Another characteristic feature of some comments is that there is disagreement between first comments offered and later ones (e.g. comments of industries on aluminium given at the meeting on 22 January 1966 and the 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, enlargement 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 structurals 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.

(d) It is felt that a lack of association has been to a large extent the reason for the unsatisfactory development of [illegible] remarked that [illegible] association had been completed in the place of operations earlier decided. It would also appear that [illegible] provided [illegible] necessary [illegible] matter may be examined [illegible]

(e) These general short-comings have already been brought to the notice of the Chief of United Nations Industry Survey Mission [illegible] informally by the [illegible] of the Advisory (Resources) [illegible] Commission. The Government would like to emphasize that these short-comings are regretted. It would also be desirable that the experts pay more respect of individual reports [illegible] supplementary [illegible]

(f) I. Report on the Ferro-grade pig iron plant

The United Nations expert has noted the occurrence of iron ore at Bailadila, [illegible] and Baila-Dilla. The possibilities of establishing pig iron plants on the Jwalipur and Katni deposits have however not been developed at all. In fact in the case of Jwalipur deposits the matter has [illegible] only discussed with reference to an individual proposition by a private entrepreneur. [illegible] the deposits **per se** [illegible] been [illegible]

In the case of Katni deposits, a limited examination of the matter in the context of the Singrauli Coal Complex has been attempted; the case of much superior Chuchu Katkona beds in this connection has been completely overlooked.

In these circumstances the development of the proposal for Baila-Dilla is [illegible] in as much as in comparison with the other two alternatives is possible. Even in the case of Baila-Dilla only the electric process has been considered without any comparison with any other process. The electric process is again 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.

(g) II 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 Orissa. 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 on which additional information needs to be collected.

"The possibility of producing paper from mixed [illegible] and mechanical pulp has not been specifically examined for regions other than Bastar though such a possibility is clearly viable. The expert has excluded the use of [illegible] for production of paper pulp on the ground that it is earmarked 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 [illegible] 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)

[illegible] comments [illegible] enterprises and other central authorities

134. [illegible] comments are [illegible] of the recommendations [illegible] required because there [illegible] (particularly steel structurals and pipes) already exist. Their [illegible] which is, of course, in agreement with the expert's recommendations and observations [illegible] "[illegible] demand" and that there is a fictive demand [illegible], that purchasing power [illegible] space for developing the [illegible] paper, [illegible], particle-board, steel structurals and [illegible] and the possibility of export the end products.

135. Raw materials and other facilities exist; the question is as to how to materialize the recommendations and make use of other suggestions, findings and observations of the reports. The follow-up process, which is still not fully organized, reveals [illegible] experience in Madhya Pradesh and [illegible] that there is ample space to continue with the efforts of development [illegible] 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 project reports and in other research studies undertaken in Indian institutions and institutions all over the world.

Comments from institutes and enterprises

136. The institutions and enterprises discuss primarily the detailed figures and suggestions, and request more precisely. 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 ferro-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?

[illegible]

137. These comments are in general positive. [illegible] the concrete findings and [illegible] of the reports [illegible] approach [illegible] which are recommended [illegible]

V. [illegible]

138. Besides [illegible] that has been said [illegible] reports [illegible] ted, it is [illegible] that a fair general [illegible] ability and shortcomings of the reports [illegible]

139. The usefulness of the undertaken [illegible] in the preparation and final stages of the reports, [illegible] in implementing the recommendations. The fact that [illegible] reports, with their experience and fine methods [illegible] lems of the availability of raw materials, [illegible] given circumstances and conditions, is additional [illegible] It is true that the inadequate association of [illegible] potential contributors and recipients limited the results [illegible] new facts discovered in the course of the work and [illegible] raw materials 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 experience was [illegible], and the Indian scene with respect to feasibility studies is richer and more [illegible] and the capacity to research and analyse, has without doubt, expanded itself in all directions.

140. The possibility of utilising the findings and recommendations is certain after it has been proved that they are in accordance with the needs and plans of the country. The question arises when one attempts to materialise 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

4. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] either a long-term [illegible] WHO office representa- [illegible] greater detail the [illegible] help [illegible] the results are [illegible]

ANNEX I

SUMMARIES OF REPORTS AND SUPPLEMENTS

Metals

[illegible] MAKING

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] aluminium, viz th [illegible] production [illegible] different [illegible]. Nevertheless, [illegible] exists where [illegible] fuel and electric power or [illegible] transport costs or other eliminated [illegible] aluminium [illegible] important factors are investments in electric [illegible] infrastructure.

[illegible] conditions either for the supply of locally raw materials and fuel [illegible] proximity or [illegible] markets. Some salient points for the suitability [illegible] particular [illegible] for putting up an aluminium industry are given below:

[illegible] investment in plant and equipments. The unit cost of the largest two sizes of alumina plants are only 4[illegible].0 per cent and [illegible] per cent of that of the smallest plants and in the case of smelters, 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 aluminium industry, viz the production of alumina.

[illegible]

(d) Cost of fuel and at [illegible]. [illegible] oriented to the [illegible] production [illegible] alumina [illegible]

(e) Alkalies and other materials. [illegible] different prices and profitability of the [illegible] kinds of alkalies is closely linked with the quality of the bauxite. The [illegible] alkalies in the Bayer process of aluminium production can be compensated by the use of either (i) calcinated soda [illegible] per cent Na$_2$O, (ii) solid caustic soda 77 per cent NaOH or (iii) electrolytic caustic soda 50 per cent solution NaOH. However, the use of these alkalies depends on their prices.

(f) Transport costs. It is important to realize the effect of transport costs on aluminium production. For the production of one ton of aluminium, ten tons of material movement is involved and 44 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 resources 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

[illegible] times lower than the world market price [illegible] of the [illegible] quality (Pt.III, Chapter 10, [illegible]).

Capacity utilization

[illegible] existing alumina units in India are considered as uneconomic as their capacities are below [illegible] tons per year. The production cost of alumina varies between Rs. [illegible] per ton, [illegible] twice the price of alumina in the world market. The reasons for the [illegible] between local production cost and world market prices may be:

[illegible] with [illegible] of capital investment,

[illegible] economic position;

[illegible] prices of raw materials.

The [illegible] in the production cost of alumina in India amounts to [illegible], some of [illegible] in their countries of the world. The price of imported alumina is Rs. [illegible] per ton as against Rs. 200 to [illegible] on the world market. For the poor quality of the bauxite used in India, the consumption of bauxite, [illegible], fuel, alkali, etc. are high compared to alumina plants elsewhere. The existing alumina plants lack automatic control systems and resulting adventures 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 Renukoot 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

[illegible]. The In[illegible] smelters [illegible] tariffs. The price range [illegible] the result of [illegible] determined by the State Electricity Boards [illegible] real costs of generation [illegible] (Pt.III, Chapter [illegible]).

Manufacture of aluminium goods

[illegible]. There are at [illegible] twelve [illegible] units with [illegible] 5,000 tons, with individual [illegible] per annum. Because of the fact that [illegible] the primary [illegible] stock is high in India, the prices of the processed goods are [illegible] above world prices. Added to uneconomic capacities of the secondary units, there is the lack of specialization which is necessary to cut costs of production. Rolling mills with capacities of [illegible] to 50,000 tons or even [illegible] tons per annum and extrusion mills of 5,000 to 10,000 tons per annum are [illegible] common today. (Pt.III, Chapter 10, 1.4.[illegible])

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)

[illegible]

[illegible] existing resources [illegible] on the [illegible] industry, [illegible] definite [illegible] existing and future [illegible] to be com- [illegible].

[illegible]

[illegible] industry in India [illegible]:

[illegible] tons [illegible] electric current can be kept within the range of world market prices;

[illegible] bauxite resources, India can produce [illegible] per annum (which corresponds to the planned output of [illegible] tons of aluminium per annum), of which [illegible] middle-grade bauxites only are [illegible];

[illegible] for 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 [illegible]. Fine coal can also be supplied after assortment;

[illegible] The supply of other raw materials (such as alkalies, petroleum coke, pitch, cryolite and fluoride) 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.

[illegible]. If the level of aluminium production should [illegible], then this constitutes the first stage of realization, the second stage will become necessary when the country's production will be raised to [illegible] per annum. For the first phase of realization, several variables present themselves as shown below:

(a) Expansion of existing capacities from [illegible] per annum requiring a total investment of Rs. [illegible] to [illegible] million. This will not, however, be adequate to cover even domestic requirements, so some of them will still have to be imported.

(b) Maintaining the present level of production ([illegible] tons) in the existing units and the construction of a single new alumina plant with a capacity of [illegible] tons per annum and a single aluminium smelter of [illegible] 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,[illegible] to [illegible] 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 Madras unit capacity to [illegible] tons of alumina and 25,000 tons of aluminium. The total availability of metal will thus be increased to 184,000 tons and the over-all investment will come to Rs. 1,[illegible] to 1,[illegible] 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,[illegible] to [illegible] 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

aluminium plants with an output of 100,000 tons of primary aluminium has been ma
for particular micro-locations, both in Madhya Pradesh and Mysore. (Pt.III,

[illegible]

[illegible]

[illegible] plants	[illegible]		[illegible]	
	Alumina (without gross margin)	Alumina with gross margin	[illegible]	[illegible]
Mandvi (Gujarat)	9,[illegible]	[illegible]	[illegible]	-
Ratnagiri (Maharashtra)	[illegible]	[illegible]	[illegible]	
[illegible] (Mysore)	[illegible]	[illegible]	[illegible]	-
[illegible] (Mysore)	[illegible]	[illegible]	[illegible]	-
[illegible] (M.P.)	[illegible]	[illegible]	-	[illegible]
Pendra (M.P.)	[illegible]	[illegible]	-	[illegible]
[illegible] (M.P.)	[illegible]	[illegible]	-	[illegible]

1/ 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.

[illegible]

Source: [illegible] : Pre-investment kits for the [illegible] Ministry

a/ Prebaked carbon nodes
b/ Including carbon plant maintenance, supervision and indirect abour
c/ Including cathode replacement

[illegible]

[illegible]

[illegible]

[illegible] Madhya Pradesh [illegible]

Madhya Pradesh [illegible]

[illegible]

40. [illegible] India. [illegible]

41. [illegible]

[illegible] fabric [illegible] per t.r, washed and screened. The [illegible] Development Corporation are also looking out full and detailed [illegible] [illegible] capacity of [illegible] million tons per [illegible], [illegible], available in very large [illegible] [illegible] and where these are are [illegible] of reasonable distances from [illegible].

[illegible] anticipated that [illegible] of the pellets will be exported and about [illegible] [illegible] production with considerable smelting advantage over [illegible], [illegible] power [illegible] the rate of production.

[illegible] due [illegible] with Kathara in the north and [illegible] in the south [illegible] other industrial complex is envisaged including [illegible] time, the [illegible] would naturally contribute to the economic distribution of products and the counter-flow of other goods and materials.

[illegible] of the necessity [illegible] a minimum [illegible] would fuel owing to freight [illegible], [illegible] electric furnaces are proposed, of the latest modern design, for an output [illegible] of tons per day.

[illegible] satisfactory semi-coke becomes available at a cheaper rate than one of the non-coking fuels, semi-coke might be considered [illegible] consumption would be low. In the meantime, calculations are based on the [illegible] from the steel [illegible].

[illegible] facilities in a dense forest country, it is recommended that an expert opinion be invited on the possibility of local charcoal production for these limited fuel requirements.

[illegible] Regarding electric power, it is assumed that before 1975/76, a large hydro-electric station will be operating based on the Indrawati River or the Tatabodan in south Bastar. From the statewise aspect, it is desirable to achieve the full economic development of Bastar. The price should not exceed Rs. 0.02 per kWh, but Rs. [illegible] has been assumed for safety.

[illegible]. While dealing with the ore preparation, the advantages of smelting pellets have been clearly demonstrated but it is recommended that large-scale production is essential for low operating costs of a pelletizing plant. It is anticipated that the power consumption for the electric furnace should not exceed [illegible] kWh per ton of iron.

[illegible] with very [illegible] treatment, [illegible] may prove beneficial [illegible] self-fluxing sinter. [illegible] can [illegible]

[illegible] Regarding [illegible] it is pointed out that pending receipt of more detailed [illegible] engineering firms abroad, the estimates of [illegible] are only approximate.

[illegible] To prevent [illegible] increase in output per unit (at least [illegible] per [illegible]) with maximum economy in power consumption, [illegible] anticipated. The National Mineral Development [illegible] project [illegible] and their estimate [illegible] tons per annum is quoted as Rs. 10.7 [illegible] plant. It is intended [illegible]

It is [illegible] not be less than Rs. [illegible] per ton on the [illegible] a gross profit margin of Rs. [illegible] per ton [illegible]

[illegible] The present [illegible] iron plants and steel, of the Goa Plan [illegible] the Fourth Plan, and subject to export [illegible] source of supply from these west coast [illegible]

[illegible] However, [illegible] increase in capacity should arise in the Fifth Plan, [illegible] consider the further expansion of Bhadravati by [illegible] electric furnaces for the special production of foundry iron.

15. The project for [illegible] plant at Hospet is naturally of great interest to Mysore [illegible] interesting possibilities. However, apart from the steel policy, there is considerable scope in that area for economic production of foundry iron, based on high-grade ore deposit and pelletising. This would take place in association with an expanding development of the ore export trade through adjacent ports.

16. Thus, with the west coast production provided for and in the light of the above situation, it is pointed out that it is unnecessary at this stage to submit any detailed project for Mysore.

[illegible]

[illegible]

[illegible] tons per [illegible]

	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible] pipes		[illegible]	[illegible]
[illegible] sleepers		[illegible]	[illegible]
Other [illegible]			
[illegible] industry		[illegible]	[illegible]
[illegible]			[illegible]
	[illegible]	[illegible]	[illegible]

[illegible] demand [illegible] the report [illegible] anticipated target [illegible]

[illegible] the existing [illegible] capacity [illegible] tons per annum, there [illegible] foundry grade pig iron [illegible] that [illegible]

[illegible] estimate demand [illegible] the actual production [illegible] steel production of [illegible]

[illegible]

[illegible]

	Tons
Castings for automobile industry including exports	[illegible]
Engineering works	1,[illegible]
Ingot moulds for steel plants	[illegible]
Buildings and domestic requirements	[illegible]
Pipes and fittings	[illegible]
Railway equipment	[illegible]
Total	[illegible]
[illegible] official planned castings production for 1970	[illegible]
Pig iron requirements	[illegible] (i.e. [illegible])

[illegible] Iron and Steel Board

[illegible]

[illegible] of the fourth [illegible] application [illegible]

[illegible]

[illegible] uncoordinated [illegible] preparation [illegible] expecting [illegible] units should be [illegible] the [illegible].

[illegible]

[illegible] with the con- [illegible] Northern Territories, [illegible] and Whole Smelting [illegible] the preliminary [illegible] period 1971-1976 or later, [illegible] more detailed study.

[illegible] Foundry pig iron per [illegible] Pradesh [illegible] Bihar is to [illegible] the chief consumer of [illegible]

[illegible] Figure for foundry [illegible] targets and the progress of [illegible] 1975-1976 there should be [illegible] Therefore, Indian Iron for [illegible] a few years time [illegible] (250,000 tons) to supply the [illegible] the proportion India [illegible] to closely [illegible], particularly the East India

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 (Madhya 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
(Mr. Harry Sillners)

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 (Bhadravati) 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 Bhadravati 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 requirements for 1975/76 is calculated to be 8,900 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 in Bhadravati after some modifications, can be used for such a combined smelting plant, i.e. the production of chromium alloys. Furthermore, the power consumption in Bhadravati is already well above the prescribed limit of 15,000 KWh.

52. After a few changes in their production structure, the existing small 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 [illegible],000 or 7,000 tons high-carbon ferro-chrome a year.

53. The existing 6,000 KVA ferro-silicon furnace could, after modifications, produce silicon-chrome provided preliminary smelting tests are favourable. Part of this silicon-chrome can be desiliconised to low-carbon ferro-chrome.

54. For technical collaboration, Mysore 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 Mysore 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 2,000 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 modernization of the rather old furnaces (built in 1944 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 M/s Ferro Alloy Corporation at Gopalpur, which have been licensed to produce low-carbon ferro-chrome, are not likely to start production of low-carbon ferro-chrome

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 development 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 ferro-chrome to meet the demand of the [illegible] steel plants which are coming up fast. Ferro-chrome production at Bhadravati can be started as soon as a [illegible] 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 question of obtaining 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 Balaghat is the richest in India, high in manganese and phosphorus content ranging from very low to very high, quartz and limestone of high purity are also available. As regards coke, Madhya Pradesh has the possibility of producing from non-coking coal 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 for the suitable types of ferro-alloys, the least susceptible alloy is electrolytic manganese; and silicon manganese is also well-placed. 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 65 per cent of all the ore tonnage exported from Madhya Pradesh has a higher than 45 per cent Mn content, whereas the corresponding figures for Bonsora and Gotaon are about 40 and 35 per cent Mn, respectively. The higher manganese

[illegible] Bathy [illegible] mines ore is a [illegible] advantage. [illegible] in the northern part of [illegible] has a phosphorus content up to [illegible] per cent.) In order to get good quality ores required for internal consumption, new mines may have to be opened up or new agreements arranged by the government. [illegible] there should be no difficulties in the supply of raw materials. [illegible] the Government should make arrangements for the supply of, for example, [illegible] tons per year with [illegible] per cent Mn and a maximum of [illegible] per cent P content.

[illegible]. In Mandari where under ground mining is done, the present dump ores constitute about [illegible] tons for every [illegible] tons of ore delivered. Marvali mine in Jabalpur has a similar ore as Mandari (up to [illegible] per cent Mn in low siliceous ore and the deposits are much higher; the dump ore with a high phosphorus content cannot be used for metallurgical purposes but can be exploited for production of electrolytic manganese. The Stockholm Institute of Technology, Sweden, has produced samples of pure electrolytic manganese from Indian manganese ore with phosphorus contents as high as [illegible] 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.

[illegible]. Suitable location of the plant can be found along the railway line Nagpur-Raipur near the transmission line Bhilai-Bodhghat 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 Raipur-Bilaspur, where water supply is sufficient. Bilaspur and Marwi, [illegible] miles from Bilaspur, have also been mentioned as possible plant locations.

[illegible]4. 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.

[illegible]. To exploit the dump 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

[illegible]. From non-coking coal in the Surguja District in Madhya Pradesh, [illegible] produced a coke (char) almost free from phosphorus, with an ash content [illegible] per cent and possibly lower, and with better electro-metallurgical properties than those of the more expensive so-called metallurgical coke, [illegible]. This new char would be next to ideal for the [illegible] of ferro-alloys and [illegible] for electrical pig iron produced in India and may constitute a viable and profitable industrial enterprise independent of a possible ferro-alloy production in the State.

[illegible]. With the exception of a few cases where charcoal or chips of reducers of high purity are indispensable, coke is quite [illegible] and is a reliable [illegible] for most alloys. Some non-coking coal from Madhya Pradesh seems to [illegible] possibilities in this respect.

[illegible]. A most important precondition for a reliable production is a sufficient 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.

[illegible]. 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 desirable. The volume weight expressed as [illegible] per hectolitre (and its inverse value used in England - the bulk density, expressed in ft^3 per ton) should refer to the normal charge 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.

[illegible]. A carbonizing plant for the production of electro-metallurgical coke (char) in Madhya Pradesh is recommended. Selection of coal for the coke production investigation and practical tests should be started at the Surguja coalfields. These are said to have huge reserves of consistent quality in a single seam. The other coalfields that have been mentioned should not be neglected. Not only the

[illegible] and [illegible] strength of the [illegible] [illegible] reducing the ash [illegible] [illegible] investigated. The information about the [illegible] in regards to the high reactivity of the char [illegible] the [illegible] properties [illegible] reactivity depending on the [illegible] nature of the [illegible], and [illegible] and expressed in [illegible] [illegible].

73. Regarding the [illegible] the [illegible] and the reduction of the ash content [illegible] the [illegible] [illegible] ash content than the [illegible] [illegible] [illegible] mentioned that the ash content may [illegible] [illegible] [illegible] are [illegible] in the process, e.g. the [illegible] which otherwise [illegible] to be added as quartz. Indian coke [illegible] per cent ash content will be quite suitable in most cases provided due consideration is given to the reactivity and other properties of the coke. In cases where ash content of [illegible] per cent would be too high, the possibility of further reducing the ash content by washing the coal should be studied before switching over to other low- ash producers such as the expensive charcoal.

74. As regards the location of the carbonizing plant, it is advantageous to build the plant near a coal mine, preferably with direct connections between the plant and the mine in order to save on transport costs.

75. The smallest economic unit that can be recommended for flushing and coke ovens has a coal through-put of [illegible] tons a day corresponding to [illegible],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 extensions without large-scale modifications of existing equipment.

74. The estimated costs of the carbonisation (flushing and) equipment, for a plant of this capacity are Rs 4.45 million, of which an equivalent Rs. [illegible],000 will be needed in foreign exchange. Additional costs for waste heaters add up to Rs. [illegible],000, of which an equivalent of Rs. [illegible],000 will be required in foreign currency.

[redacted]

[redacted]

[redacted]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] the other [illegible] topics [illegible] for Madhya Pradesh is

(a) The production of [illegible] sponge iron [illegible] purposes. The [illegible] should be made [illegible] investigation from the metallurgical point of view of the properties and economics of the iron produced according to the different procedures available, i.e. (i) [illegible] (ii) [illegible] (iii) [illegible] (iv) [illegible] and (v) [illegible], and [illegible] with practical smelting tests and results in a following [illegible] report. The entire work is a job of [illegible] duration, although not necessarily a full-time job, and can very well be combined with other simultaneous investigations.

(b) To analyse the possibility and best way of producing foundry pig iron from, for instance, the [illegible] iron ore

[illegible]

[illegible]

[illegible]

[illegible]

The [illegible] for high-carbon ferro-chrome and [illegible] the [illegible] possibilities in India to arrange for a production with shortest delay by modifying their existing furnaces. However, the expert has been informed that HSL does not propose taking up the ferro-chrome project immediately due to various reasons. The second best possibilities are to be found in Electro Metallurgical Works in Dandeli with whom the question might be discussed. The expert can arrange for skilled foreign collaboration.

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

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

About [illegible] million hectares of [illegible] forests (valuable mixed forest) are located mainly in Eastern region. Forest inventories are available through the [illegible] Pre-investment Survey. Bamboo availability in 1986 for paper industries is estimated at 520,000 tons/year (without taking into account the reduction due to flowering).

[illegible]. 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

[illegible] concentrated [illegible] the same [illegible] the [illegible] [illegible] suitable [illegible] for [illegible]

[illegible] approximately [illegible] likely to increase [illegible]

[illegible]

[illegible] however, the [illegible] though [illegible] relatively easy [illegible]

[illegible]

[illegible] the supplier of paper [illegible] venture [illegible] the pulp and paper field [illegible] highly competitive. Thus, [illegible] cannot [illegible] the raw material available in Madhya Pradesh, [illegible] should be [illegible] production of printing and writing paper, [illegible] now [illegible]

[illegible] paper and paperboard [illegible] rated capacity [illegible] wrapping and waste paper. There are [illegible] Paper [illegible] with a rated capacity [illegible] year [illegible] expansion [illegible] tons year was licensed in order [illegible] capacity to [illegible] tons/year. Second, the Oriental Paper Mills [illegible] printing and writing paper with bleached sulphate pulp from bamboo. The licensed capacity is [illegible] tons/day while at present it is producing [illegible] tons per day and is likely to arrive at [illegible] tons/day.

Site location and recommendations

103. In view of the present information about the availability of fibrous raw material 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) bagasse-based mill in Orchha or Bhopal.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

109. For [illegible] mill, the gross profit on the investment is estimated at [illegible] per cent for pulp mills and 24 per cent for paper mills.

[illegible]

[illegible]

110. The demand for paper in [illegible] State in 1965 was [illegible] tons. The projection of paper demand for 1970, 1980 and 1990 is respectively 57.6, 135 and 300 thousand

[illegible] same year and the [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] abundance. The price [illegible] should come to [illegible] become a higher [illegible]

[illegible]

[illegible] supplier of paper to other states for a long time, [illegible] competitive. Thus the new projects cannot be [illegible]

[illegible] Paper Mill from [illegible] tons to [illegible] tons per year [illegible] tons to [illegible] tons per year and the new project [illegible] Paper Mill (printing and writing) 21,000 tons per year on

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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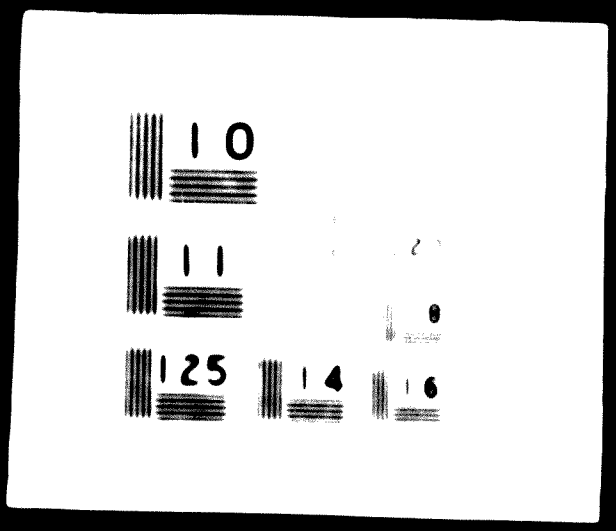


[illegible]

[illegible]

[illegible]

M[illegible] [illegible]

[illegible] for [illegible] capacity [illegible] is Rs. 450. For the [illegible] working at only 44 per cent of its capacity, the sale price works [illegible] compared with the ruling market price of Rs. 450. [illegible] production [illegible] in India reached only 44 per cent of the installed capacity.

[illegible] 10,000 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.

[illegible]

[illegible]

[illegible]

F[illegible] in Mysore State

Raw materials

138. About 60 per cent of the total for [illegible] in the four districts of North Kanara, South Kanara, Mysore and Shimoga. The quality of the forests is good. A total of 10,000 tons per year of suitable wood for fibre-board and waste wood are available within 40 miles distance of each of the four centres, viz Khanapur 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. 50 per ton ex-factory.

Utilities, infrastructure and supporting construction facilities

139. 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 India 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.

[illegible]

[illegible]

[illegible]

[illegible] working [illegible] with the world market [illegible]

[illegible]

[illegible] estimates and others [illegible]

[illegible]

[illegible]

[illegible]

Development [illegible]

148. [illegible]

149. As [illegible] it should [illegible] board [illegible] of board should [illegible] carried out [illegible] tates, the manufacturers and the consumers. [illegible] the manufacturers to continue their production [illegible] as walls and other items such as sound-absorbing tiles.

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 per cent of the whole world production of fibre-board is exported. The United States of America and the United Kingdom import fibre-board. Also countries

[illegible]

[illegible]

[illegible]

Table [illegible]

Steel pipe and tube output in selected countries, [illegible]
(in thousands of tons)

	USA	Western Europe a/	UK	Eastern Europe b/	USSR	Japan	India
1964	7,449	5,337	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1963	6,555	5,020	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1962	6,399	5,215	1,058	[illegible]	[illegible]	1,349	[illegible]
1961	6,072	5,023	1,106	1,[illegible]	[illegible]	1,719	[illegible]
1960	6,930	4,625	1,343	1,629	[illegible]	1,227	[illegible]

Source: The European Steel Market in 1964, table 26, p.70, Document ST/ECE/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.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] discussed with brief comments on manufacture [illegible] Proposals are supported to establish two electric-welded plants for the production of steel pipe, one each in the States of Madhya Pradesh and Madhya Pradesh. The processes adopted in the layouts suggested for these [illegible] are known to be technically feasible; for the conditions proposed therein, they are shown to be economically acceptable also.

[illegible]

[illegible] Madhya Pradesh, [illegible] estimated at [illegible] S$ [illegible] usually high fixed charges which determine the economic feasibility of the project. In these circumstances, the report [illegible] 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 [illegible] tons a year [illegible] and large diameters. The cost of such a plant is estimated at Rs. [illegible] lakhs (S$ [illegible]).

158. 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 unbuilt project designs.

159. 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.

[illegible]

[illegible] **sales** [illegible] Rs. [illegible] tax, [illegible] lakhs [illegible] taxes, is suffi- [illegible] years. This [illegible] Rs. [illegible] rupees. Should [illegible] production of [illegible],000 tons [illegible]

Madhya Pradesh

Plant site

164. [illegible] area of 10 [illegible] to one of the State's larger communities, such as Bhopal, Indore or Bhilai, is desirable.

Cost of production, earning and rate of return

164. 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 5½ years or a return on the investment of about 18 per cent.

[illegible]

[illegible]

[illegible] The report [illegible]
the establishment [illegible]
Pradesh should [illegible]
capacity of [illegible] tons annually [illegible]
Pradesh. The most [illegible]
within [illegible] miles radius of the [illegible]
offers the availability of [illegible]
and rail transport systems, water supply and [illegible]
tions. First, it will have favourable effects [illegible]
from the nearby establishment of a heavy structural [illegible]
Most immediate is the prompt availability [illegible]
expansion and modification plans

166. The new plant should be operational on two-shift basis [illegible] tons of fabricated structural units annually. [illegible] Industrial Programmes for the Fourth Five-Year Plan for Madhya Pradesh, December 1964, the existing fabricating capacity, [illegible] will be sufficient only for half the demand of [illegible] tons of heavy structures estimated for 1965/66. 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

[illegible]

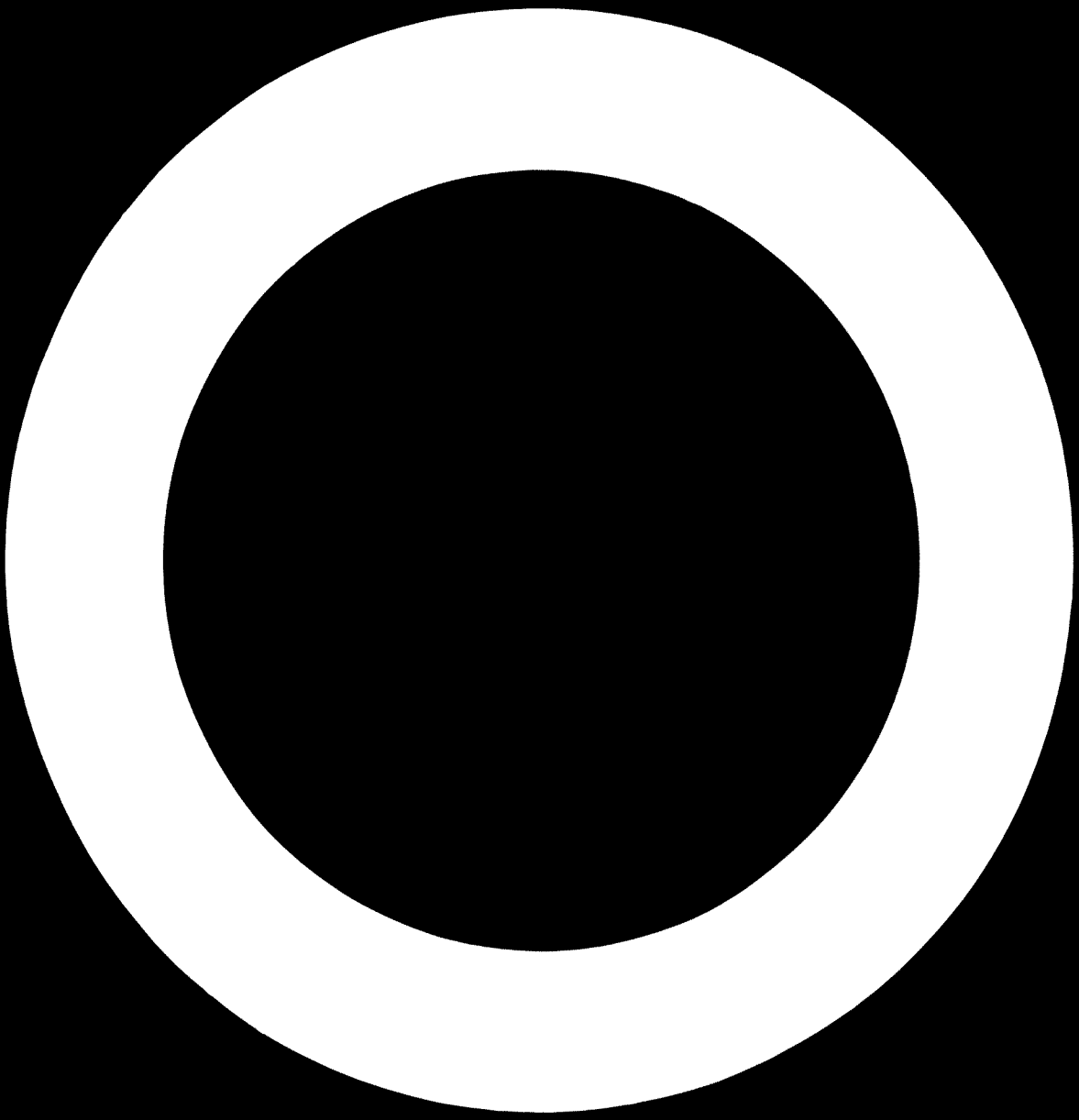
[illegible]

[illegible]

[illegible] "assumption" [illegible] concept [illegible] the [illegible] of the [illegible] [illegible] However, [illegible] which has been adopted [illegible] was, [illegible] derived from the average [illegible] three typical [illegible] product. This average [illegible] per [illegible] does not [illegible] favourably with export [illegible] from other countries.

Project profit [illegible]

17. The gross annual sterling returns of the plant have been estimated at $1,51[illegible] This will be reduced to $ 1,[illegible],000 annually after deducting an average 4 per cent depreciation on capital cost. With income tax at the assumed 51.5 per cent, the remaining annual net profit should come to $ 462,000. Divided into $ 8.[illegible] million investment, this is equal to a 5.4 per cent return on payout period of 18.1 years.



[illegible] existing [illegible] is seeking for the [illegible] of existing industries [illegible] tary and [illegible] definition of the scope of the [illegible]

[illegible]

[illegible] were [illegible] reports were formulated. [illegible] examined, [illegible]

[illegible] bl[illegible] [illegible] according to the [illegible] without distinctions). [illegible] and comprehensible" [illegible] more effective [illegible] people. The [illegible] them to the point [illegible] the international level.

[illegible] defined to [illegible] omitted that it would have been amended [illegible] the actual condi- [illegible] experience in this [illegible] work with [illegible] in the States) [illegible] would have been of great [illegible].

Availability of [illegible] background materials

6. 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.

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

[illegible] what [illegible] and how these [illegible]. [illegible] many new studies and reports [illegible] listed in para [illegible] of the main body of the [illegible]. In follow-up process, the [illegible] should be taken [illegible] through the [illegible] have been opened up. This follow-up work will also be useful for strengthening and promoting capability for carrying out feasibility studies.

Organization [illegible]

The plan of operation

8. The plan of operation was [illegible] proper way. No [illegible] were made in case the contemplated prerequisites were not [illegible] (this could mean lack of data or counterpart, impossibility to [illegible] 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 aluminium, 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

[illegible] with the [illegible] through [illegible] [illegible] Indian raw material [illegible] comments [illegible] of the pro- [illegible] most of the [illegible] of work [illegible] in the ex- [illegible] dure are indis- [illegible]

Counterpart work and staff

11. Counterpart work and staff is of the utmost importance in such studies. The expert usually could not have been acquainted with organizational set-up of sources for data, and with the specific data he has to take into account while doing the study. He cannot do all the necessary investigations and collection of data and the processing of these and draw up conclusions by himself exclusively. Generally speaking, feasibility studies are usually undertaken by foreign organizations or institutes employing all kinds of experts, technicians and economists. At the beginning of the project there were very few 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 organizations (institutes, departments and so on) who were to participate in the project did not designate officers 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

12. 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.

[illegible] Interim [illegible] reports were [illegible] alloy and [illegible] ven[illegible] [illegible] not partici[illegible] reports [illegible] successful [illegible].

14. Outlines for the final reports [illegible] fibre-board. The first [illegible] draft of the final reports were [illegible] and fibre-board at the meetings held in [illegible] of Ministries. It is [illegible] ports need to be developed [illegible] good and applicable reports. [illegible] and mistakes in the findings and the observations.

15. The work of the Co-ordinator in the [illegible] task. The definition of the project was not firm [illegible] many of them: the missions for depth, pre-investment [illegible], the project leader, Chief of the Mission, [illegible] and finally the Co-ordinator. The duty of the Co-ordinator was [illegible] ordinate and write the consolidated report (according to the plan of operation to put together all reports and to write summarizing forewords). 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

[illegible]

[illegible]

[illegible]

[illegible] the fact that [illegible] the experts [illegible] This [illegible] TA for the work [illegible] specific arrangements and [illegible] carried out by the experts for ferro-alloy and [illegible] Otherwise, this task was accomplished [illegible] investigations. Naturally, in [illegible] some knowledge could be imparted to [illegible] knowledge was [illegible]. But there was not [illegible] training in an organized way. [illegible] The review of the [illegible] study, the consolidated report and the experts' report [illegible] direction [illegible].

Conclusions and recommendations

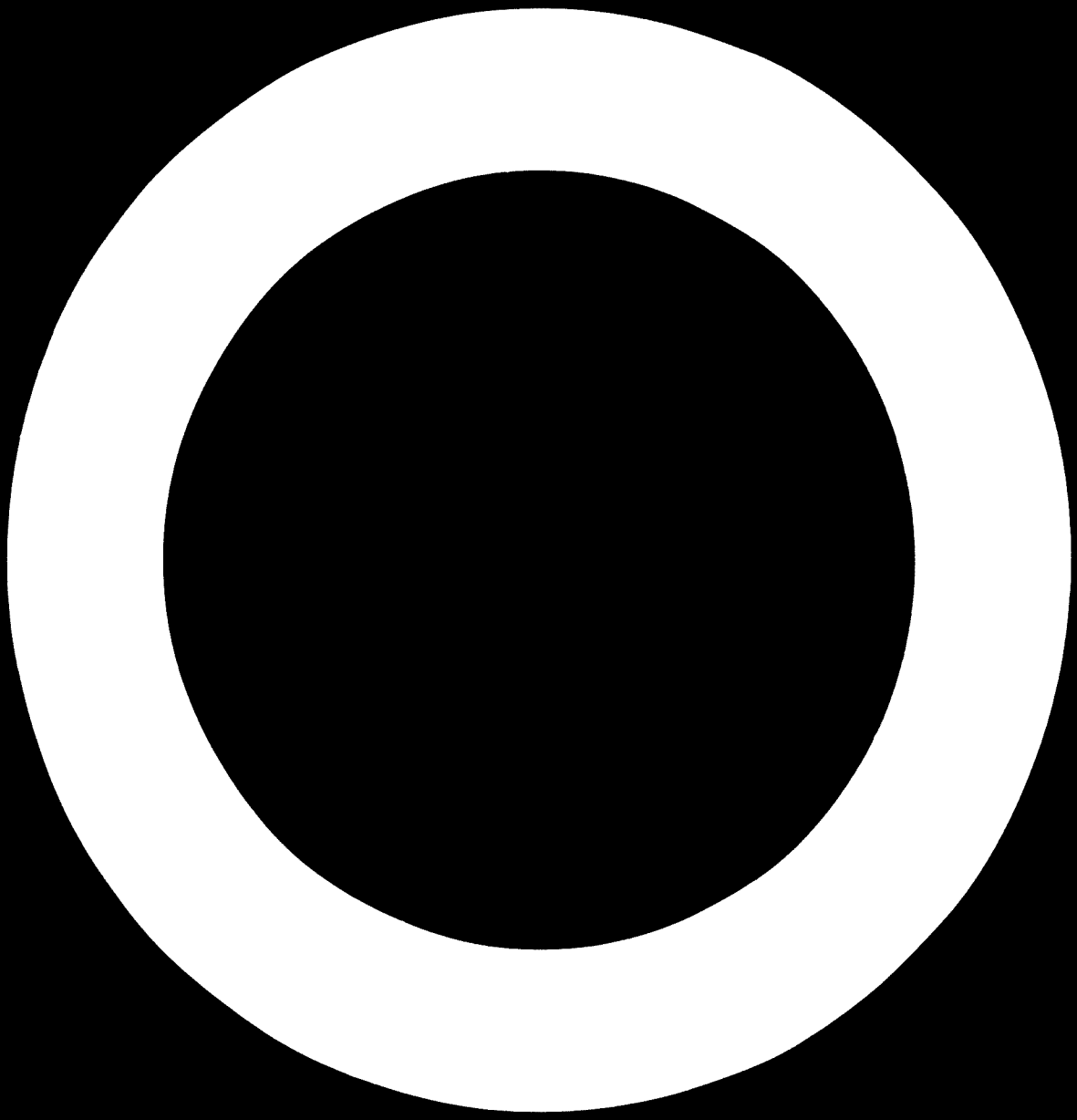
19. [illegible] work on this project was good attempt to organize and execute United Nations Technical Assistance to India. From the achievements as well as from shortcomings of the organization and procedures, it is possible to draw valuable conclusions and experience for the future work on feasibility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

20. It is necessary to appraise and evaluate the reports as such and the organization and procedure of work and to take decision on the organisation 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.

[illegible]

1. The organization and procedure for [illegible] improve if the organization and procedure [illegible] ways [illegible] decided upon in advance and [illegible] in writing. [illegible] experts' and co-ordinator's reports to [illegible].

2. Such projects require very much the [illegible] of the Secretariat's office in the course of preparation [illegible] and background material [illegible] completion of the task.



[illegible]

[illegible]

Contents	Page
. [illegible] of the organization and [illegible] work	
.. Counterpart work and staff requirements	
. Scheme for increasing the national and practical knowledge in experts' field	

1. In the course of the United Nations industrial investment survey project in India, there arose the need for some guidance in 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, 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 (counterpart 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.

[illegible]

[illegible] experts' [illegible]

[illegible] preparation of the work [illegible] work. The [illegible] them together, [illegible] than filtering [illegible]

[illegible] preparations and the expert's time of [illegible] would be necessary to form a team of [illegible] background material and problems [illegible] the expert's [illegible]

14. [illegible] preparation [illegible] along with the relevant problems [illegible]

The [illegible] with the expert in the field
Realization stage one

Investigation work and [illegible] formulation and definition of the survey

15. Investigation work including the briefing of the expert by the resident representative, the co-ordinator, counterparts and sponsors. Development of a plan of work for the expert and counterparts [illegible] carried out by the expert and counterpart with the assistance and [illegible] of the co-ordinator and approved by the sponsors.

16. The specialist work 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 a 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 officers.

[illegible]

Progress [illegible]

19. Progress [illegible] and [illegible]

20. The next [illegible] At this stage, the [illegible] report [illegible] counterparts and United Nations headquarters [illegible] about findings and recommendations [illegible] report [illegible] place.

21. During the whole period of [illegible], progress [illegible] be regularly. The preliminary reports [illegible] progress report. The progress report should be reviewed regularly [illegible] the progress of work and the fulfilment of plans in order to carry out the study successfully. This will be done by the sponsors [illegible] the United Nations agency.

The development of the final report[1]

22. The draft of the final report is to be developed [illegible] in advance [illegible] 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 operation.

The other regular or incidental work of the expert

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.)

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[1] The general scheme on contents of the report is developed separately and enclosed in annex 4.

[illegible] expert [illegible] are asked, make suggestions [illegible] existing industries [illegible] under the terms [illegible]

[illegible] the [illegible] co-ordinator [illegible] experience [illegible]

[illegible] period [illegible] for [illegible] of the assignment [illegible]

Implementation of the report findings and recommendations: Implementation stage two

Appraisal and evaluation of the report and other work of the expert

[illegible] and the ways and criteria of appraisal and evaluation [illegible] determined on the basis of the duty assigned and [illegible] expectations.

Composition of the consolidated report

[illegible] This [illegible] level and [illegible] as a whole, [illegible] on the specific project, taking [illegible] of the appraisal and evaluation meetings, conclusions and observations.

Follow-up process

30. This process is mor[illegible] the [illegible] of the counterparts and sponsors but the United Nations is [illegible] interested in it for the sake both of evaluation and improvement [illegible] future undertakings.

31. Counterparts and sponsors should follow up implementation of reports and try to bring about the necessary [illegible] or rectification of shortcomings and mistakes and errors, if any. The final evaluation of [illegible] 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.

[illegible]

[illegible] This section is intended to give [illegible] what on the counterpart's work and staff [illegible] the experts of this project. The word 'counterpart' is applied to the expert from the State or central institutions and [illegible] assigned to work with the United Nations expert on study [illegible] together and the United Nations expert is a member [illegible] counterpart [illegible] specialists and vice versa.

United Nations expert [illegible]

[illegible] Before going to any particular explanation, [illegible] clear that an United Nations expert in this or [illegible] investigation and accomplish work by himself alone [illegible] United Nations assignment is to associate the [illegible] United Nations expert with domestic experts and specialists of the country from the government department, institutes, institutions, enterprises, associations and the like. Counterpart's participation is inevitable in [illegible] stages of this study [illegible] with the collection of background material [illegible] implementation of the project.

14. One of the main aspects of the United Nations expert's work is to provoke and stimulate interest in counterpart in the study. In this way, [illegible] report could be prepared and implementation assured. [illegible] the necessary increase in the level of theoretical and practical knowledge in 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 'counterpart' belongs to all of them who participate in the accomplishment of the assigned duties as requested by the Government of India but he has to differentiate between directly assigned particular state and central level counterpart 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.

[illegible] counterpart work and staff

[illegible] and responsibilities of counterpart staff were defined in the Plan of Operation of the project (illegible) at its start as follows:

> "[illegible] the terms of reference of the project Indian [illegible] staff [illegible] assigned for this work. In the initial stages, the following officers have been designated: the Director of [illegible], [illegible] Metallurgical Engineer and a fourth assignee, [illegible] engineer is to be designated.
>
> Director of [illegible] is the counterpart of the Mission leader, and he will be responsible for the [illegible] participation in the work. [illegible] the [illegible] staff who is occupied with many duties that are both technical and administrative in nature. He will, therefore, not be able to devote more than half of his time to the work of the Mission. Metallurgist and Geologist are to be assigned on a full-time basis to the Mission."

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

> "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 NCAM 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 such 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 background 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 ferro-metallurgy (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.

[illegible]

[illegible]

53. The immediate task of counterparts in Madhya Pradesh and Mysore is to take care of the accomplishment of the studies in progress (i.e. on ferro-alloys and fire-board) 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 EXPERT'S [illegible]

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.

62. 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 enou h 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

[illegible] FEASIBILITY ANALYSIS [illegible] DECISION MAKI[illegible] [illegible] TAKING [illegible] THE FEASIBILITY STUDY

[illegible]

Prerequisite analyses

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, guidance for finances (in local and foreign currencies) required for plant, equipment and working capital.

Contents of prerequisite 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 1/ for (i) the State and (ii) All-India.

1/ Planning Commission has issued Notes on the Perspective Development of India for the Period 1960/61 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, [illegible] demand and production and (ii) the Airlines's demand and production.

(c) The production and/or consumption trends of the integrated products in a similar developing country and in a more developed country.

(d) The feasibility of export for 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 demand 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 main 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 ex-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.

[illegible]

[illegible]

[illegible]

7. Each group [illegible] prerequisite [illegible] important and [illegible] a certain minimum.

Analysis of the alternative locations

8. This analysis [illegible] according to the resources available and [illegible] their possibilities in the country. These [illegible] terms with the strong areas and the advantages.

Analysis of the economic feasibility

9. This section [illegible] items:

1. Estimate [illegible] comparison with the existing product [illegible] with the figures in the literature for [illegible]

   [illegible] capacity for the existing one and [illegible]

   [illegible] The [illegible] items of the equipment from the [illegible]

   [illegible] [illegible] items

   [illegible] work [illegible]

2. [illegible] and [illegible]

   [illegible] direct and indirect cost [illegible]

3. Approximate [illegible] This can be indicated by a comparison with similar [illegible] elsewhere in the country and abroad. The indices of the profitability [illegible] worked out by several methods. The method applied [illegible] must be adequate to the specific situation and applicable [illegible] proposed field of industry.

4. Economic [illegible] different [illegible] scenarios.

National benefit analysis

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

a. Import substitution [illegible]

b. Export substitution

c. Relief of unemployment

d. Further utilisation of potential resources

e. Development of the industry in the region

f. Regional development [illegible] and others

g. Other specific benefits

h. Other intangible benefits

Analysis of other factors

10. Included in this section of the prerequisite 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.

Analysis about the implementation

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 required:

(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.

Final notes

12. Collection of information related to day-to-day statistical, explorational, 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

[illegible] work. Sometimes the [illegible] of analyses may also be a very [illegible] It may happen that an incomplete analysis can satisfy the purpose because [illegible] analysis was provided. For instance, in the mining industry, the analysis of the [illegible] properties and quality of ore, and of the mining conditions [illegible] sufficient [illegible] world-wide standards exist which justify undertaking feasibility study with only these data. Even so, the best [illegible] elaborate analyses [illegible], they then become the part of the feasibility report.

[illegible]. There is strong [illegible] and expectation by the author that if these papers are further amplified and [illegible] by the illustrative cases, parameters and criteria for [illegible] conditions 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 [illegible] contribution from a United Nations project towards identification of possibilities for the development and utilization of Indian resources for industrialization can be achieved.

[illegible]. 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 on 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 utilisation 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, G.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 [illegible]-Indian 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 bill.

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-cum-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.

[illegible] PRODUCT ANALYSIS [illegible]

21. As illustration of furtherment of pre-requisite analysis for taking up a feasibility study [illegible] we take up the case of the pulp and paper project in the State of Madhya Pradesh. Of course, the illustrative case cannot be developed to the full extent. It is just an indication of how to start with the application of [illegible]. The real case must have been more [illegible] following the [illegible] chapter and sub-chapters with the possible extension of the new facts [illegible] 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 therefrom. 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.[illegible] 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.[2/]

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

2/ Notes on Perspective Development of India, 1960/61 to 1975/76.

into consideration the increase in population, consumption in Kenya [illegible] can be estimated to be approximately [illegible], 214,00[illegible] and [illegible] tons 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. FAO estimates[3] 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 1950s and during the first half of the 1960s, the highest growth rate in consumption was in Asia, i.e. [illegible] 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 worlds' 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 91 million tons in 1964 to 124 million tons by 1970, 141 million tons by 1975 and ~~[illegible]~~ 202 million tons by 1980, showing an average growth rate of 5.1 per cent during 1964-80.[4] 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.

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

4/ FAO (1966) Paper and Pulp 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 1980, 65 per cent of the demand for newsprint, [illegible] 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 these groups may reach [illegible] per cent, [illegible] per cent and [illegible] per cent respectively by 1980.

Demand in developed countries

30. If we look at Western Europe and the Union of Soviet Socialist Republics we find that the over-all consumption has increased from 2.04 million tons per annum during 1960-1961 to [illegible] million tons in [illegible]/61, showing a compound rate of increase of 7.[illegible] per cent per annum in one decade. The consumption in this region is likely to grow at the rate of [illegible].7 per cent per annum during the 1960s reaching a level of 15.62 million tons by 197[illegible] (7.4 per cent increase per annum during the 197[illegible]) reaching a level of 27.65 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 [illegible] 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	18.65	[illegible]
1975	21.21	2.6
1980	30.24	7.4

Source: Jain, Export Prospects for Paper, FAO, Rome.

34. India's share in world trade has been negligible, around [illegible] 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. This, 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 foreign 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^3, 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, Raigarth, Korba, Jashpur, Surguja, Raipur (East, South and North), Bastar (East, West and North), Kanker, Rewa, Shahdol, Sidhi, Umaria, Betul, Bhopal (East and West), Hords, Hoshengabad, Hirer, Dhar, Indore, Karnad, Khargore, Chhindwara, Damoh, Jabalpur, Saugar, Satpura Sooni, Chhatorpur, Panna, Oura, Swalipur, Sheopur and Shipuri.[5/]

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.

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

[illegible]

[illegible] Madhya Pradesh [illegible] relatively cheap [illegible] in the north east. In the south of the [illegible] from a well-[illegible] tariff, however, [illegible] but might be [illegible] with a careful steam power [illegible] pressure [illegible] the [illegible] generator [illegible] the [illegible].

[illegible] permanent rivers [illegible] great flow after the monsoon [illegible] the [illegible] season. The maximum flow [illegible] the [illegible] at Hirakud [illegible] is [illegible] and a minimum flow [illegible]. Apart from the obvious necessity to take care of the [illegible], there [illegible] might [illegible] consider for the choice of a mill site, that is to say, the minimum flow should not only feed the mill but also secure a good dilution [illegible] effluents.

45. [illegible] pulp mill will require around [illegible] m [illegible] of process water per ton [illegible] tons a day [illegible] m³/day (1,250 m³/hour). That is relatively easy to find in the permanent rivers of Madhya Pradesh with the minimum flow.

Labour force

46. As many industries in Madhya Pradesh are presently working without abnormal 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 Niperia in Bilaspur Tehsil of the Bilaspur district and the other is near Rajnandgaon in the Durg District. Both

6/ Lecacheux's Report.

[illegible] South Eastern Railway. [illegible] half an hour from the Bilha railway station. [illegible] Eastern Railway [illegible] available [illegible] all important [illegible] port.

[illegible] The Seonath river [illegible] water [illegible] Mahanadi river upstream and the Arpa river downstream [illegible] the Mahanadi river. It is a perennial river [illegible] water [illegible] be met.

[illegible] At Korba there is a thermal power station [illegible] capacity [illegible] is about [illegible] million units [illegible] existence. The capacity of this thermal station [illegible] be increased during the Fourth Year plan period. This [illegible] meet the power requirements of the [illegible] A high tension [illegible] over [illegible] distance.

[illegible]. As regards the availability of various chemicals [illegible] near Raipur about [illegible] km from Bilha railway station. [illegible] chemical grade is available from [illegible] other nearby areas which are very close to the proposed site. Caustic soda and [illegible] are available from [illegible] when a caustic soda chlorine plant will be established near Raipur or at Champa during the Fourth Year plan period. The [illegible] all 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.

Near Rajnandgaon

[illegible]. The other suitable location for the central pulp mill is near Rajnandgaon in the Durg district on the bank of Seonath river. Rajnandgaon is a railway station on the main Bombay-Howrah line of South Eastern Railway. It is about 162 km from the Bilha station, 44 km from Bhilai, 55 km from Kumbari, [illegible] km from Raipur and 267 km from Korba along the railway line. The whole area is well served by roads. Rajnandgaon lies on the national highway connecting Bombay and Calcutta via Nagpur. All sources of bamboo suggested earlier are well connected by road or rail. The requirement of power fuel, chemicals etc. can be met on this site from the same sources that have been discussed before.

[illegible]

[illegible]

[illegible]

[illegible] of the input [illegible] production [illegible] process of inputs. [illegible] of [illegible]

[illegible] structure

[illegible] of the [illegible] inputs have [illegible] decreased [illegible] chemicals and steam, which account for three-fifths of total cost. Waves, though important, have comparative [illegible] The above [illegible] prices and cost structure are a [illegible] of economic feasibility of the proposed study.

Investment estimates

55. Economic production and marketing of pulp at prices comparable with international prices can only be achieved by designing sufficiently large capacities (500-400 tons/day) for these central pulp mills. The probable

[illegible] these [illegible] necessary [illegible]

[illegible]

[illegible] important targets of [illegible] self-sufficiency and the raising of [illegible] as additional push [illegible] earnings from paper are given in [illegible]

[illegible]

[illegible]

[illegible] crores

Year	Paper and paper-board	Articles of paper and paper-board	[illegible]
1965/66 actual	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	4[illegible]

Considering the small export earnings (Rs. 7[illegible] lakhs) in 1965/66, the above target 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. 7[illegible] lakhs in 1965/66 to Rs. 4[illegible] crores by 198[illegible], 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.

57. Establishment of a mill in Bastar region will save the country from drainage 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 [illegible]90 is likely to be generated directly with the setting-up of this unit and

about 2, [illegible] persons will be employed in felling, cutting, collecting, sorting etc. [illegible] the forest and the transport trade.

[illegible]. 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 utilisation 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)

Introductory Notes

1. The need to encourage [illegible] investment in new production, and the development of all kinds 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 on a wide scale and in an understandable way of prospects for investments. The available publications are more or less meant for the information of banks, 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 K Dhari's Economic Guide for Investors, the Handbook of India and the Stock Exchange's Official Directory (Bombay), are very useful, but not developed to the point to serve all potential investors. These publications are not as widely used as the popular booklets 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 on 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 future investors, and the supporters of the projects on a regional or other basis (e.g. community 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 authorities. 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 categories. 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

tendencies. The manuals and handbooks should play a positive role in order to realize this end. In [illegible] way, various additional forms of information [illegible] exist if [illegible] editions [illegible] never [illegible].

[illegible] detailed content [illegible] interest. [illegible] needed for the [illegible]

[illegible]

1. [illegible] principles and aspects, [illegible] investment [illegible] provide general [illegible] parameters [illegible] branches of the industry and other secondary activities.

5. [illegible] followed [illegible] for various branches of industries with [illegible] information [illegible] investment prerequisites and potentialities [illegible] parameters, criteria [illegible] details of manufacturing terms, [illegible] inputs and outputs, [illegible] operations.

6. Additional [illegible] written for the industrial [illegible] with detailed information regional circumstances, environments, and possibilities for investment. [illegible], parameters and technical economic criteria (in physical [illegible] financial terms) [illegible] considered.

7. All [illegible] must present assistance and encouragement in order to stimulate undertakings for all interested. It [illegible] deeper understanding of investment [illegible] the consequent effects on the development of the country's material [illegible], and later on the standard of living and on human development. It must also indicate a scientific approach and an understanding of the methods of computing parameters and areas of productivity of the specific investment undertaking.

[illegible] of the [illegible]

Part I. Investment and the [illegible] as [illegible]

Chapter [illegible]. General concept [illegible] of investment

(a) Definition of investment, the [illegible] results
Kinds of investment

(b) Distinction by type of investment - [illegible] economic [illegible], social welfare and [illegible]
Distinction by [illegible] of [illegible]
[illegible], health [illegible] welfare

(c) Technical structure - building [illegible], assembly of equipment, preparation of [illegible], [illegible] studies, land acquisition [illegible]

(d) Types of investments [illegible] - [illegible] plants, main and auxiliary [illegible], [illegible] and [illegible] 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, [illegible] and large-scale industries, plants, factories [illegible] complexes

Chapter [illegible]. Legislative regulations on investments

(a) Investment policy and needs of the country

(b) Legislative regulations favorable for investment

(c) Freedom of investment

(d) Bodies and authorities assisting investors

Chapter [illegible]. Prerequisites for investment and getting profits

(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

[illegible]

[illegible] ers [illegible] investments with [illegible]

[illegible]

savings [illegible]

Chapter [illegible] Investment

[illegible]

Part II. [illegible]

9. Investme[illegible] [illegible]. [illegible] attempt at investment [illegible] add [illegible] investment [illegible] develop the production level [illegible] capit[illegible] for investment. [illegible] investment [illegible] sp[illegible] process of economy and not an [illegible] one. Relation to processes are primarily governed by the profit [illegible] the planning. It is the place of scientific research to answer: when, [illegible] and [illegible] to invest money. The answer can 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.

[illegible]

[illegible] The parameters [illegible] number and type, [illegible] practice, [illegible] criteria [illegible] the [illegible] type and number of parameters [illegible] below and should be [illegible]

Chapter 6. Parameters and criteria [illegible]

(a) Norms of [illegible]

(b) Input per [illegible]

(c) Optimum [illegible]

(d) Structure of investment [illegible]
[illegible]
Equipment
[illegible]

(e) Investment per [illegible]

Chapter 7. Parameters and criteria [illegible]

(a) Norms of materials per [illegible]

(b) Input structure [illegible]
Material input
Depreciation
Labour

(c) Figures for imports [illegible] developed [illegible] countries)

(d) Rates of depreciation [illegible]

11. 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 project and maximum should be used as a goal.)

Chapter 8. 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 of capital)

(c) Structure of fixed and working capital

(d) Turnover of working capital

(e) Rentability, manufacturing return, profitability

Chapter 9. Other parameters and criteria

Part III. Appendices

Appendix [illegible] [illegible] report [illegible] requirements

Appendix [illegible] [illegible] is presented in a, [illegible]

Appendix [illegible] [illegible] relating to investment, with [illegible] the [illegible] for [illegible]

Annex [illegible]

ADDITIONAL REPORTS BY THE CO-ORDINATOR

Contents

A. GENERAL REPORT OF THE CO-ORDINATOR

1. This report gives the gist of the work accomplished which could not be covered in the long limited 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, memos, 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 replaced by itself.

Tasks and accomplishments

2. During the progress of the project and from other reports a number of tasks evolved. First, to bring the successful end the work of two experts in the field for whom the preconditions were not favourable. The ferro-alloy expert had no counterpart; 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 studies 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 uncovered 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 Resident Representative [illegible] on all lines.

4. The plan for the work of the experts [illegible] actions necessary and, in addition, [illegible] ments required for improving the [illegible] and methods of work.

5. The following tasks were accomplished:

(a) The solution of uncovered [illegible]. They were [illegible] necessary and therefore dropped.

(b) The important study [illegible] and particular, along with the expert, was [illegible].

(c) The experts in the field [illegible] with institutions and [illegible] good results, especially from the States.

(d) The follow-up work [illegible] and comments invited from all parties [illegible] good results, especially from the States.

(e) Intensive work on the preparation of the new [illegible] studies together with State authorities, institutions and [illegible] 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 counterparts 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.

[illegible]

[illegible]

[illegible]

Experts and [illegible]

[illegible] adequacy of the short [illegible] in the future [illegible] in the recruitment and shortcomings in the performance. All the experts were [illegible] specialists with adequate background for the [illegible] (except [illegible] in one case). They were, of course, primarily technical [illegible], but [illegible] with economic problems. This does not mean that their [illegible] in the world were suitable experts for these specific kinds of study and [illegible] experienced in making feasibility studies in a developing country.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] was not of minor importance as far as experts dealt with some [illegible]

[illegible]

[illegible]

14. Apart from [illegible] Report and the annexes [illegible], some general [illegible] evolve from this report.

15. This project, though not large in the amount [illegible] the number of experts engaged in it, was a big [illegible] of the number of local personnel and organisations engaged [illegible] the results and benefits to be reaped by the implementation of [illegible] achievements. This project differs from the other pre-investment surveys in so far as it made a very intensive contribution towards industrial development with special

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] the plan.

[illegible]

(a) [illegible] the State [illegible]

(b) The feasibility study for [illegible] textile machinery [illegible] which the know-how [illegible] available. India at present [illegible] in all countries [illegible] for which for their textile machinery.

(c) The feasibility study for [illegible] chemical production [illegible] large scale [illegible] the State which is [illegible] the most suitable [illegible] the country.

(d) The study for [illegible] the organisation for design of petrochemical plant equipment and machinery. The production of crude oil in India is increasing and [illegible] State is one of the largest contributors. The largest part of petrochemical plant equipment is imported while the [illegible] engineering industry [illegible] idle due to lack of designs. This fact is generally recognized in India.

[illegible]. 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 capabilities 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.

[illegible]

Conclusion and recommendations

64. The demand for the studies of this project continued to exist and new [illegible] were [illegible], some of which were the result of findings and recommendations of the submitted reports.

[illegible]

[illegible]

[illegible]

[illegible] will [illegible] independent [illegible] the industrial development of the country and [illegible] attaining self-reliance and take-off results along with meeting [illegible] wants of the maritime independently.

[illegible]

[illegible]
[illegible] JAMMU AND KASHMIR

[illegible] However, [illegible] States. [illegible] expert was asked [illegible] which falls [illegible] from the funds [illegible] achievements [illegible] requires a [illegible] study was made [illegible] added that [illegible] rendered. It stands [illegible] study, [illegible] the absence [illegible].

Findings, conclusions and recommendations

40. Market availability and demand 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 conifers. The consumption of paper in India is very low, around 1.5 kgs <u>per capita</u> per year. The characteristic feature of existing pulp and paper production in India is that plants are of a small size apart 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).

Kraft grade pulp in Kashmir

[illegible]. Selection of the process was [illegible] were made for producing strong fibre [illegible] "super-super" cord. This process [illegible] costs. If the size of production [illegible] might be contemplated. Alternative [illegible] discussed and presented comprehensively. Production [illegible] duction costs have also been [illegible] Rs.11[illegible], which production [illegible] at Rs.[illegible] per ton [illegible] kraft pulp was about Rs.[illegible] the feasibility study was compiled. [illegible] were described. Lower production costs [illegible] (at present 41 per cent of the total production costs) goes down and further savings are made in raw-material consumption. It was found that other facilities, like water, coal (shipped from Pithoragarh at high costs), were available. The economic feasibility was not assessed.

Newsprint in Jammu

43. The erection of a newsprint plant of 300 tons [illegible] 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 composition 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.

[illegible] was [illegible] Rs. 1[illegible],000, [illegible] in-[illegible] which [illegible] to be imported. [illegible] s[illegible], [illegible] and interest on [illegible] were estimated [illegible] Rs.[illegible] per [illegible], i.e. [illegible] Rs.[illegible], [illegible] and loss they [illegible], [illegible] with [illegible].

[illegible] Committee of the [illegible]. It was concluded that [illegible] commodities of [illegible]. For the country, the [illegible] of unutilized resources was [illegible]. However, [illegible] additional calculations must be done [illegible], transport costs and so forth. While Jammu and Kashmir [illegible] resources [illegible], even if costs are higher, it would [illegible] worthwhile [illegible] these resources fully. It was suggested [illegible] reasonable prices [illegible].

4[illegible]. The [illegible] the Inspector General for Forestry found the report [illegible] considering [illegible] prices of wood. State authorities [illegible] use [illegible] report in their negotiations with foreign [illegible] plant.

4[illegible]. [illegible] requirements of [illegible] feasibility report. [illegible] expert [illegible] and to give proper [illegible]lations, [illegible] previous reports, especially with regard to figures, [illegible] standards and process of selection. In this way and [illegible] direct contacts with the relevant institutes, production units and producers 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 considerable even if at the moment there are no possibilities [illegible] implementation of new plants in Jammu and Kashmir.

49. It is necessary to underline the industrious efforts of the expert and his goodwill to do his best under unfavourable conditions and in the absence of counterpart (technologist) and of economists to calculate more alternatives.

It is necessary to acknowledge the generous and valuable assistance of Mr. F. D. Strawey, Senior Consultant of [illegible] (Germany).

The next task of the expert

50. The FAO project on forest resources survey [illegible] required to hire logists for utilization in the [illegible] survey. [illegible] FAO representatives were [illegible] with the [illegible] assigned to carry out the feasibility study [illegible] the Resident Representative and Co-ordinator [illegible] transferred to that project and in that way [illegible] was accomplished. Negotiations were successful [illegible] the expert is now engaged for two years in three [illegible] (for the [illegible]).

51. In this way co-operation between United Nations [illegible] was achieved. The expert of this project was able to help the FAO project [illegible] and to speed up some of the work (wood test, information [illegible] and acted also as a consultant.

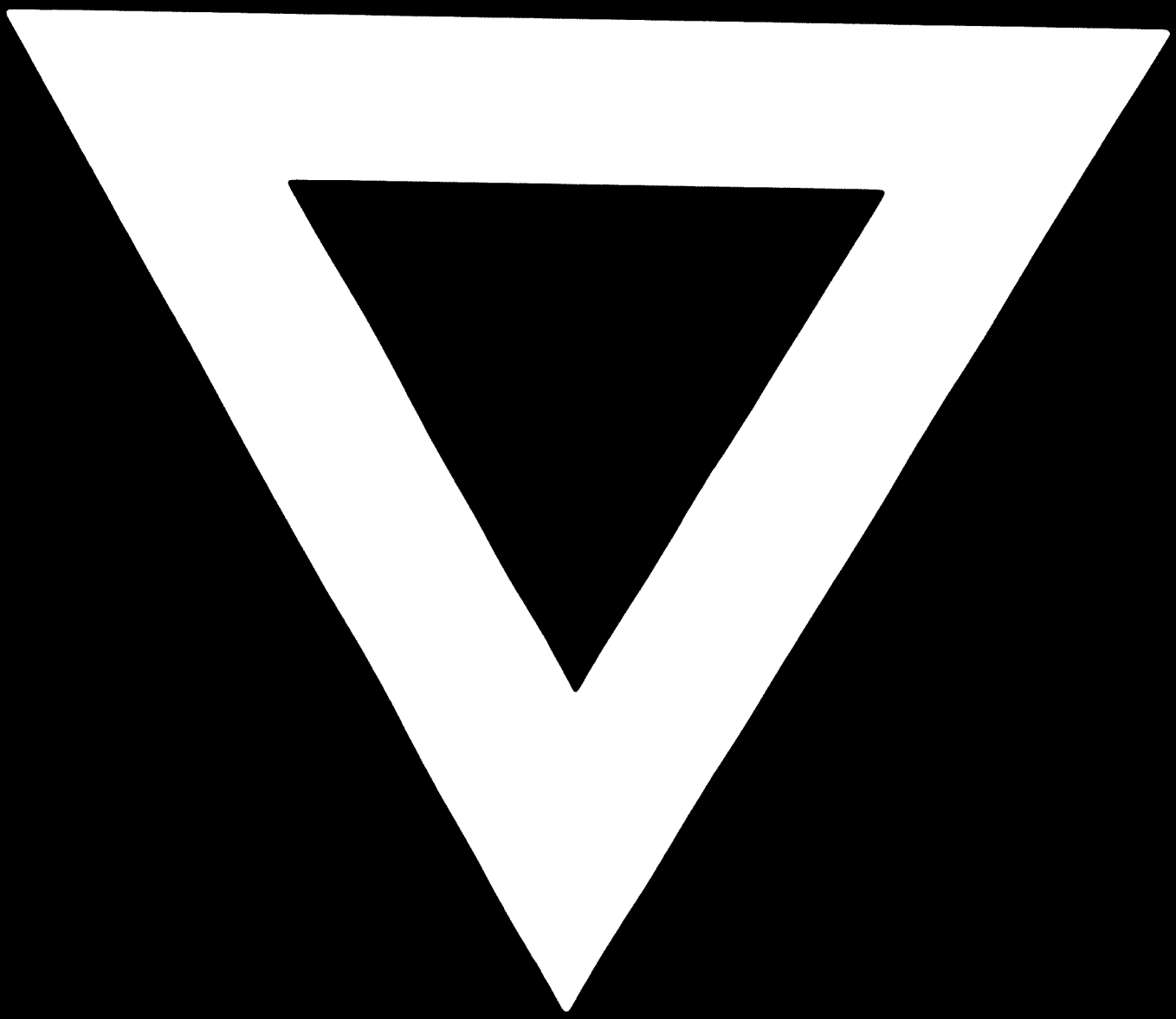
Conclusions and recommendations

52. The accomplishment of this study has rendered valuable [illegible] 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 scarcity of rayon grade pulp and illness 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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