JICA

THE FEASIBILITY STUDY REPORT
ON THE MODERNIZATION OF BURNPUR WORKS
OF INDIAN IRON AND STEEL CO., LTD. IN INDIA

June 87

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June 1987

Japan International
Cooperation Agency

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PREFACE

In response to the request of the Government of India, the Government of Japan has decided to conduct a feasibility study on the Project to modernize BURNPUR Works of Indian Iron and Steel Co., Ltd. and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to India a study team headed by Mr. Takashi Mori, Japan Iron and Steel Federation, from the 23rd of June to the 25th of July, 1986.

The team had discussions on the Project with the officials concerned of the Government of India and conducted a field survey in the project-related areas. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of India for their close cooperation extended to the team.

Tokyo, June 1987

Keisuke Arita

Keisuke Arita
President

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Chapter 1

Introduction

Contents

1. Introduction

1-1. The objective and course of the study

This study was made, in compliance with the request of the Government of India, for the purpose of modernization of BURNPUR Works of Indian Iron and Steel Co., Ltd. (IISCO), a subsidiary of Steel Authority of India Ltd. (SAIL). Accordingly it aimed at drawing up a modernization plan for IISCO's BURNPUR Works by studying the present condition of the Works and examining technological, financial and economic facts.

The study did not aim at giving advice on their renovation and operation, but it was to plan modernization of BURNPUR Works of IISCO by introduction of new facilities in an adjacent site while utilizing effectively existing facilities.

When India's Prime Minister Rajiv Gandhi visited Japan in November 1985, he made a request to the Japanese government for cooperation in modernization of the steel industry in India.

Having received the request, the Japan International Cooperation Agency (JICA) dispatched a preparatory survey team to India in February 1986 and signed a scope of work (hereinafter referred to as S/W) for carrying out a feasility study on the modernization of BURNPUR Works of IISCO (hereinafter referred to as F/S) between the Government of India.

JICA entrusted the Japan Iron and Steel Federation (JISF) to carry out the F/S and JISF organized a survey team headed by Mr. Takashi Mori, JISF, and consisting of 14 experts (a list is given later) and executed the F/S.

The survey team visited India for about one month from June to July 1986 and conducted field survey of plants and

sites centering on BURNPUR Works and discussion with those concerned of Indian side, and after return to Japan, the team engaged in the study in Japan for about three months based on data and information obtained during the field survey. The period spent for the field survey and the study in Japan was extremely short as compared with that usually spent for a feasibility study of this kind.

For six days in November 1986 when the Indian counterpart visited Japan, the study team had intermediary discussions with them on the contents of F/S.

By strong request of the Indian side in the course of the discussions, the study team was obliged to repeat the work for review of capital investment and others from the standpoint of obtaining the maximum effect with investment of limited funds.

This F/S report is the final report that covers all the results of reviewing work in the period from November 1986 to February 1987.

JICA hopes that this report can contribute toward the modernization of IISCO's BURNPUR Works.

1-2. Scope of the study

The scope of work of this F/S is specified in S/W signed between the Government of India and JICA's preparatory survey team (headed by Mr. Takao Suzuki) dispatched to India for 13 days starting from February 25, 1986.

In IISCO's BURNPUR Works, all processes of raw materials, iron making, steelmaking and rolling were made the object of the study, and the study was made for drawing up a modernization of the Works.

At IISCO's GUA mine, the study was confined to treatment of fine ore which is required in connection with the modernization of BURNPUR Works.

1-2-1. Field survey

As regards IISCO's BURNPUR Works, the study was made and necessary data obtained concerning the present condition of facilities, operation, organization and personnel of each production process of raw materials and fuel, iron making, steelmaking and rolling, and also each field of maintenance and utilities as well as the present financial condition of the Works.

The present F/S is for BURNPUR Works alone and the infrastructure such as railway, roads and township around the Works was put outside of this study.

To obtain reference data for the modernization plan, the study team visited SAIL's steel plants at Bhilai, Bokaro and Durgapur, IISCO's KULTI foundry and Tata Iron and Steel Co.'s Tata Works and others.

The team also collected data and information related to the present condition and forecast of steel demand and supply in India.

At IISCO's GUA mine, field survey was made concerning fine ore treatment.

The officials and others of the Indian side with whom the team had a pleasure to meet and discuss during the stay in India totalled more than 180 including the counterparts of SAIL and IISCO. (See list of persons given later.)

JICA takes this opportunity to express sincere gratitude to those who cooperated with the team in its field survey.

1-2-2. Study work in Japan

Based on the data and information obtained by the field survey, technical experts in respective fields made study of production technology, facilities, plant layout, personnel and others, and drew up modernization plans, in their respective fields.

On such plan, overall adjustment was made on works layout, material balance, energy balance capital investment and others to make an overall modernization plan.

In addition, on this modernization plan, financial analysis and economic analysis were made.

The study at home was made on the following premises.

(1) Based on the discussion between JICA preparatory study team and the Indian counterpart, production capacity of 2 to 2.5 million T/Y in terms of crude steel was made the target for the Works. And it was also decided that blast furnace - basic oxygen furnace process was to be adopted as production method to achieve the target.

(2) A tract of land owned by IISCO and adjacent to existing facilities of the Works was considered as the site for modernization of the Works.

(3) As a result of discussions with the Indian counterpart based on the steel demand and supply forecast provided by SAIL, it was decided that the study be made with the Works' product mix being centered on non-flat, or long, products.

In view of the limited space of the Works and also for effective utilization of existing facilities, the team considered it more advantageous that the Works produces mainly non-flats as at present.

(4) The target in productivity and level of production technology was that it be not inferior to that of other steel plants in India and as close as possible to international standards.

(5) Prices of imported equipment were estimated on the basis of domestic purchasing prices in Japan. Prices of those to be purchased in India were estimated based on Indian prices where unit price was provided by the Indian side and on Japanese domestic prices where Indian unit price was not available.

(6) As data and information necessary for the F/S could not be obtained adequately because of the limitation of time for field survey and others, the F/S had to be made by setting some preconditions or assumptions at stages of the study work in Japan.

(7) Financial analysis was made on the assumption that the accumulated deficit of IISCO at present has no effect on the financial accounting under consideration.

1-3. Study schedule

June 23 - July 25, 1986:

Field survey conducted. The team consisted of 15 members and Mr. K. Takeda, Head, Industrial Survey Div., JICA. During the period the team gave explanation on Inception Report and submitted Progress Report to the Indian counterpart. (See Study schedule given later.)

August - November 1986: Study work in Japan

November 1986:

Discussions with the Indian counterpart on Interim report.

The Indian counterpart consisted of 5 members as follows:

SAIL : Mr. H. Bandyopadhyay, Additional Director

IISCO: Mr. M.F. Mehta, Managing Director

Mr. J. Ganguli, General Manager (Projects), BURNPUR Works

Mr. M.S. Chawla, Deputy General Manager (Iron and Steel), BURNPUR Works

MECON: Mr. S.L. Narasimhan, Chief Engineer

(See Minutes of meeting given later.)

November 1986 - February 1987:

Restudy based on discussions with the Indian counterpart on the Interim report

February - March 1987:

Preparation of Draft Final Report

March 18 - 25, 1987:

Explanation on the Report to the Indian counterpart

List of Members of Survey Team

Leader	Mr. Takashi MORI
Sub-leader & Technical Coordination	Mr. Takeo BABA
Coal & coke making	Mr. Yoshinori ITO
Iron ore & sinter	Mr. Toshiaki KANEKO
Blast furnace	Mr. Hisanori USHIKUBO
LD (BOF) furnace	Mr. Ken-ichiro YOSHINO
Continuous casting	Mr. Shin-ya UEDA
Rolling	Mr. Hiroshi AKEDO
Utilities	Mr. Moriichi ENOKITO
Maintenance	Mr. Tetsuaki KUMASAKI
Civil & building engineering	Mr. Itsuo NOZAWA
Financial analysis	Mr. Hideyuki YOSHII
Market analysis	Mr. Yasuhiko TAKASHI
Education	Mr. Akinori GOMI
Economic analysis	Mr. Akira KANAI

FIELD SURVEY SCHEDULE (Transportation and Accommodation)

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
		Jun.								Jul.																								
Date		23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Members of the Team		Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.
1	Takashi MORI	LT→	AD D	D	D	D→C→A B	B	B	A→C→	AT													LT→AD	D→C→A B	B	B	B	A→C→D D	D	D	D	D	D	LD→AT
2	Takeo BABA	LT→	AD D	D	D	D→C→A B	B	B	B	B→G→B B	A→C C	C→D D	D	D→C C	C	C→A B	B	B	B	B	B	B	B	B	B	B	B	A→C→D D	D	D	D	D	D	LD→AT
3	Yasuhiko *TAKASHI*	LT→	AD D	D	D	D→C→A B	B	B	A→C C	C→D D	D	D	D	D→C C	C	C	C→D D	D	D→C C	C→A B	B	B	A→C C	C→D D	D→C C	C→A B	B	A→C→D D	D	D	D	D	D	LD→AT
4	Hideyuki YOSHII	LT→	AD D	D	D	D→C→A B	B	B	B	B	B	B	B	A→C C	C	C→A B	B	B	B	B	B	B	B	B	B	B	B	A→C→D D	D	D	D	D	D	LD→AT
5	Akinori GOMI	LT→	AD D	D	D	D→C→A B	B	B	B	B	B	B	B	B	A→C C	C→A B	B	B	B	B	B	B	B	B	A→C→D D	D	D	LD→AT						
6	Hiroshi AKEDO	LT→	AD D	D	D	D→C→A B	B	B	B	B	B	B	B	A→C C	C	C	C→A B	B	B	B	B	B	A→C C	C→D D	D	D	D	LD→AT						
7	Hisanori USHIKUBO	LT→	AD D	D	D	D→C→A B	B	B	B	B→G→B B	B	B	B	B	A→C C	C→A B	B	B	B	B	B	B	B	B	A→C→D D	D	D	LD→AT						
8	Moniehi ENOKITO					LT→	AC→A B	B	B	B	B	B	B	A→C C	C	C→A B	B	B	B	B	B	A→C C	C	C→D D	D	D	D	LD→AT						
9	Yoshinori ITO					LT→	AC→A B	B	B	B	B	B	B	B	A→C C	C→J J	J→C C	C	C→D D	D	D	LD→AT												
10	Toshiaki KANEKO					LT→	AC→A B	B	B	B→G→B B	B	B	B	B	A→C C	C→J J	J→C C	C	C→D D	D	D	LD→AT												
11	Itsuo NOZAWA												LT→	AC C	C	C→A B	B	B	B	B	B	B	B	B	B	A→C C	C	C→D D	D	D	D	D	D	LD→AT
12	Akira KANAI												LT→	AC C	C	C→A B	B	B	B	B	B	B	B	B	B	B	B	A→C→D D	D	D	D	D	D	LD→AT
13	Tetsuaki KUMASAKI												LT→	AC C	C	C→A B	B	B	B	B	B	B	B	B	A→C→D D	D	D	LD→AT						
14	Kenichiro YOSHINO												LT→	AC C	C	C→A B	B	B	B	B	B	B	B	B	A→C→D D	D	D	LD→AT						
15	Shinya UEDA												LT→	AC C	C	C→A B	B	B	B	B	B	B	B	B	A→C→D D	D	D	LD→AT						
16	Keiichi TAKEDA	LT→	AD D	D	D	D→C→A B	B	B	A→C→	AT																								

CITY CODE:

LT	Leave Tokyo
AD	Arrive Delhi
LD	Leave Delhi
AC	Arrive Calcutta
D	Delhi
C	Calcutta
A	Asansol
Dh	Dhanbad
J	Jamshedpur
K	Kulu

ACCOMMODATION CODE:

D	Delhi (Hotel)
B	Burnpur (Guest House of IISCO)
C	Calcutta (Hotel)
Dh	Dhanbad (Hotel or Guest House of IISCO)
J	Jamshedpur (Hotel or Guest House of TISCO)

TRANSPORTATION CODE:

D→C→A:	Delhi	08:55	1C401
	Calcutta	10:50	
	Calcutta	17:15	by train (Coal Field Exp.)
	Asansol	20:40	
C→A:	Calcutta	06:10	by train (Black Diamond Exp.)
	Asansol	10:10	
A→Dh→A:	Asansol	10:10	by train (Black Diamond Exp.)
	Dhanbad	11:20	
	Dhanbad	16:20	by train (Black Diamond Exp.)
	Asansol	17:30	
C→J:	Calcutta		
	Jamshedpur		
C→D:	Calcutta	17:45	1C402
	Delhi	19:50	
D→C:	Delhi	08:55	1C401
	Calcutta	10:50	
A→C:	Asansol	6:40	by train (Coal Field Exp.)
	Calcutta	10:30	
B→G→B:	by air plane		
B→K→B:	by car		
AC→A:	Calcutta	17:15	by train (Coal Field Exp.)
	Asansol	20:40	

The persons whom the JICA Mission met during the field survey

(Department of Economic Affairs, Ministry of Finance)

M.S. Mukherjee	Joint Secretary
D. Chatterjee	Joint Secretary
G.M. Pillai	Deputy Secretary
V.K. Mathotra	Director
V. Subramanian	Director
Parvez Dewan	Under Secretary
Sarup Singh	Section Officer

(Department of Steel, Ministry of Steel and Mines)

R.P. Khosla	Secretary
Tirlochan Singh	Joint Secretary
Vinod Khurana	Deputy Secretary
Mridul Jain	Under Secretary

(SAIL-Steel Authority of India Limited)

V. Krishnamurthy	Chairman
S. Samarapungavan	Executive Chairman
G. Mukherjee	Vice Chairman
S.R. Jain	Vice Chairman (Projects)
K. Chopra	Advisor (Coal & Coke)
D.R. Mehta	Advisor (Computorisation)
V.P. Mittal	Executive Director (Engg. & Tech.)
S.K. Roy	Executive Director (Operations)
V. Ramanujachari	Director (Finance)
T.T. Joseph	Director (Projects)
S.K. Ahluwalia	Director (Commercial)
M.R.R. Nair	Director (Personnel)
H. Bandyopadhyay	Joint Director (Project Evaluation)
K.C. Agarwal	Joint Director (Engg. & Tech.)
M.N. Bagchi	Joint Director (Engg. & Tech.)
N. Jagannath	Joint Director
G.C. Raghavan	Sr. Deputy Director (Engg. & Tebh.)
Balram Singh	Deputy Director
A. Sinha	Deputy Director

A.N. Dharmapuri	Deputy Director (Engg. & Tech.)
R. Jambunathan	Additional Director (Finance)
Mahesh Babu	Executive (Chairman's Office)
S.D. Banerjee	Executive (Commercial)
J. Ganguli	General Manager (Projects)
J.K. Daspatnaik	General Manager (CALCUTTA, Marketing)
R.B. Majumdar	Sr. Manager (Engg. & Tech.)
S.K. Gosh	Sr. Manager (Engg. & Tech.)
K.K. Chapar	Chief Expert (Coke & By-Products)
S. Nag	Manager (Market Research)
S.K. Khattar	Manager (Coal & Coke)
Vikram Singh	Manager (Steel)
D.K. Jain	Manager (Engg. & Tech.)
R.K. Gupta	Manager (Finance)
C.P.S. Narayanan	Manager (CALCUTTA, Perosonnel & Administration)
M. Tobias	Manager
R.N. Rawat	Asst. Manager (Iron making)

(SAIL, Bhilai Steel Plant)

K.R. Sangameswaran	Managing Director
B.V. Kudua	General Manager (Works)
R. Krishnasnamy	General Manager (Materials)
G.C. Ghosh	General Manager (Finance)
M.G.R. Prasad	Deputy General Manger (Services)
N. Subramonian	Asst. General Manager (Iron)
U.M. Wad	Superintedent (Services)

(SAIL, Bokaro Steel Plant)

S.R. Ramakrishnan	Managing Director
Bhandari	General Manager (Rolling)
R.K. Chopra	Deputy General Manager (Iron & Steel)
M. Sengupta	Deputy General Manager (Rolling)
V.S. Dare	Asst. General Manager (Steel Melting)
S.P. Jung	Asst. General Manager (Iron Making)
Thanota	Superintendent (Cold Mill)
S. Mishra	Manager (Tech.)

G. Tiwari	Manager
S.K. Mehrolra	Manager (Public Relations)

(SAIL, Durgapur Steel Plant)

D. Mukherjee	Managing Director
A.C. Mondal	Chief Superintendent (Iron Making)
R. Banerjee	Chief Superintendent (R.& D.)
C.K. Saran	Superintendent (Sinter)
R.M. Sharma	Superintendent (Iron Making)
T.K. Chakrabarty	Manager (Tech.)
B.K. Mandal	Manager (Tech.)
V.K. Vermer	(Personnel)
A.K. Banerjee	Deputy Manager (Sinter)

IISCO (Indian Iron & Steel Co., Ltd.)
(Burnpur Works)

M.F. Mehta	Managing Director
K.D.S. Dhillon	General Manager (Works)
J.C. Sinha	General Manager (Projects)
J. Ganguli	General Manager (Projects)
D.J. Sen	General Manager (Finance & Accounts)
S.N. Das	General Manager (Personnel & Administration)
G.V. Satayanarayan	General Manager (Sales)
M.S. Chawla	Deputy General Manager (Iron & Steel)
S.K. Mukherjee	Deputy General Manager
K.V. Pai	Deputy General Manager (Rolling Mills)
S.P. Prothia	Deputy General Manager (Maintenance)
S.K. Awuja	Deputy General Manager (Services)
V.M. Rale	Deputy General Manager (Projects)
Pran Nath	Deputy General Manager (Personnel & Administration)
N.S. Satyanarayan	Asst. General Manager (Projects)
S. Choudhury	Asst. General Manager (Iron & Steel)
H. Mohanty	Asst. General Manager (Rolling Mills)
V. Gujral	Asst. General Manager (Mechanical)
S.K. Sanyal	Asst. General Manager (Power & Electrical)
Roshanlal	Asst. General Manager (Management Services)

R.K. Banerjee	Chief Superintendent (RC & RD)
P.C. Sinha	Chief Superintendent (Training & Township)
K.B. Mukherjee	Chief Superintendent (Coke Oven)
C. Barman Roy	Chief Superintendent (Iron)
G.S. Chakraborty	Chief superintendent (Traffic & Raw Materials)
P.D. Bharadwaj	Chief Superintendent (CR & OR)
M.M. Mukherjee	Chief Superintendent (Energy)
A. Sengupta	Chief Superintendent (Sheet Mills)
B.B. Trikha	Chief Engineer (Mechanical)
S. Ghosh	Chief Engineer (Power & Blast Blower)
M. Mukherjee	Chief Engineer (Gas & Oxygen)
D. Dutta Roy	Chief Engineer (Electrical)
M.M. Chakraborty	Chief Chemist (Laboratory)
N.N. Sen	Deputy Chief Engineer (Projects)
P.K. Mathur	Deputy Chief Engineer (Projects)
A.M. Dhar	Deputy Chief Engineer (Design)
P.S. Mazumdar	Deputy Chief Engineer (Civil)
D.P. Chanda	Deputy Chief Engineer (Industrial Engineering)
H. Sen	Deputy Chief Manager (Finance & Accounts)
P.K. Ganguly	Addl. Chief Engineer (Civil)
B.B. Dasgupta	Addl. Chief Engineer (Industrial Engineering)
B.K. Sinha	Addl. Chief Engineer (Projects)
R. Saxena	Addl. Chief Engineer (Electrical)
T.K. Ghosh	Superintendent (Technical)
A.M. Chatterjee	Superintendent (Coke Oven)
P. Prasad	Superintendent (By-Products)
R. Dayal	Superintendent (Blast Furnances)
B.N. Roy	Superintendent (Projects)
A. Ganguly	Superintendent (Steel Melting)
A.K. Ghosh	Superintendent (Projects)
R.N. Jha	Superintendent (Maintenance)

S.S. Choudhury	Superintendent (Energy)
B.R. Ganguly	superintendent (Electrical)
C. Sen	Superintendent (Training)
S. Banarjee	Manager (Heavy Structural Mill)
S.D. Sharma	Manager (Blast Furnace)
C.P.S. Narayanan	Manager (Personnel & Administration)
K.K. Das	Manager (Rolling Mills)
Saggi	Manager (Mechanical)
Chaudhury	Manager (Electrical)
B.N. Banerjee	Manager (Administration & Public Relations)
D.K. Jain	Manager
D. Chakraborty	Deputy Manager (Refractories)
S. Banerjee	Deputy Manager (Rolling)
Banerjee	Deputy Manager (Electrical)
A.K. Bhawtacharya	Deputy Manager (Training)
H.A. Bankien	Deputy Manager (Training)
S.C. Nandy	Asst. Manager (Personnel)

(Kulti Works)

B.K. Saha	General Manager
D. Singh	Chief Superintendent
L.B. Singh	Chief Superintendent

(Gua Ore Mines)

P.R. Merh	General Manager
S.J. Singh	Assistant General Manager
M.K. Srivastava	Chief Superintendent
R.P. Das	Sr. EX. Engineer
G.S. Prasad	Sr. EX. Engineer
R.B. Singh	Sr. Security Officer
R.C. Chatterjee	Deputy C.M.E.
T.K. Duttaroy	Manager
B.K. Malik	Manager
J.M. Minz	Manager
G.P. Gupta	Manager (Chilia Ore Mines)

D. Chatterjee	Asst. Manager
K.V. Thomas	Asst. Manager
S. Ghosh	Asst. Manager
C.R.N. Rao	Jr. Manager

(Calcutta Branch)

B. Basu	Deputy General Manager (Sales)
B.K. Banerjee	Deputy Manager (Administration)

(New Delhi Office)

J.C. Getli	Manager

(Tata Iron and Steel Co., Ltd.)	
J.J. Irani	President
K.C. Mehra	Vice President (Operations)
S.L. Srivastava	General Manager (Engineering)
M.S. Dighe	Superintendent (Ore Crushing & Sintering Plant)
Benugotal	Superintendent (Coke Oven)
C.S. Ekambram	Chief Engineer (Modernisation)
S. Sengupta	Addl. Superintendent (L.D.)
Utpal Dhar	Executive Office (Public Relations)
(Amrit Steel Ltd.)	
R. Bahadur	Commercial director
(Otto India Ltd.)	
T. Bhaskaran	Managing Director
D.D. Prabhu	Deputy Managing Director
S. Nath	Director (Materials & Marketing)
K.S. Ranganna	Director (Engineering)
(Lurgi India Ltd.)	
S.J. Dalal	Vice Chairman
R. Dayal	Vice President
A. Marakur	Engineer
(Larsen & Toubro Ltd.)	
N.R. Sudheel	
B. Sengupta	
K.V. Venugopal	Asst. Manager
K.G. Hariharan	Regional Manager
(Hindustan Steel Works Construction Ltd.)	
I.C. Jha	Chief Engineer
(State Bank of India, Burnpur Branch)	
R. Bhattacharjee	Manager
(Maruti Udyog Ltd.)	
R.C. Bhargava	Managing Director
A. Shinohara	Director (Production)

MINUTES OF THE MEETING BETWEEN JICA F/S MISSION AND INDIAN COUNTERPART FOR DISCUSSION ON PREPARATION OF DRAFT FINAL REPORT OF FEASIBILITY STUDY ON THE MODERNIZATION OF BURNPUR WORKS OF INDIAN IRON AND STEEL CO., LTD. IN INDIA

For the feasibility study on the modernization of Burnpur Works of Indian Iron and Steel Co., Ltd., the JICA F/S Mission visited India in June–July 1986 for about one-month field survey and after about 3 months of work in Japan, prepared an interim report.

Before preparing the Draft Final Report, the Indian counterpart visited Japan to discuss with the JICA F/S Mission on the basis of the interim report.

The Meeting was held in Tokyo for six days, November 18, 19, 22, 25, 26 and 27, 1986.

A list of participants is attached hereto.

The JICA team presented the results of their studies on Nov. 18th & 19th. These were studied by the Indian team and their observations were put forward in a discussion on Nov. 22nd. These were further discussed in details on 25th and 26th. These discussions were summed up on 27th Nov.

The salient points of the interim report by the presentation of the JICA team and the observations made by the Indian team are attached in Annex I and Annex II respectively.

The views of the participating members of the team were discussed in depth and the following were agreed.

1. The capacity of the plant after total modernization will be taken as 2.0 MTPA of crude steel.
2. Product mix for the works in the report will be non-flat products based on the demand/supply projections supplied by SAIL.
3. The modernization scheme of Burnpur Works aims at its techno-economic viability.

4. The draft report would work out financial and economic analysis of the entire scheme (2.0 MTPA) in totality. The one million phase being a transitional one, financial and economic analysis of this phase may not be of much relevance.

5. To extent possible within the time limit stipulated in the Scope of Work, the Japanese side will review the investment wherever possible and examine the scope of productivity, equipment specifications and capacities in the perspective of maximum utilisation of existing facilities considering quality and profitability.

6. The feasibility report will include 2 x 60 MW power plants with in view of a strong desire from Indian side, although it is reiterated that the project profitability and economics may be affected.

7. B.F. relining expenses will be reviewed.

8. B.F. slag will be granulated 100%.

9. Several alternate plans were studied for modernization of blast furnaces. The basic plan which is adopted for the present F/S, calls for a new No. 5 blast furnace at the 1st stage and a new No. 6 blast furnace at the 2nd stage. This suggests phasing out of the existing B.F.'s except for No. 1 (500 m^3) in the 1.0 MT stage. It was agreed to explain why the base case is chosen in comparison with other alternatives in detail.

   Continuity in operation of the existing B.F.s (Ex. No. 1 BF) would be primarily based on techno-economic considerations by the Indian side from implementation stage.

10. Wagon tippler will be introduced at raw material yard for various types of wagon.

11. The layout of coal yard would be reviewed in the light of the logistics constraints explained by the Indian side.

12. For the profitability calculation, the depreciation rate may be calculated at 7½% and 10%.

13. The shop wise investment for anti-pollution equipment should be separately indicated.

14. It is possible to produce high grade steel as requested by the Indian side, but it will require additional investment in steelmaking process for secondary refining and billet reconditioning. Therefore it was agreed not to consider producing high grade steel for the Feasibility Study.

15. Financial and economic analysis method is substantially one that adopted by the Japanese side.

16. In consideration of the substantial changes and various issues emerging out of the discussions, it was explained by the JICA team that it would not be possible to submit the draft final report in Jan. 1987. It was agreed that both of the teams will inform the respective authorities.

The Indian side appreciated the excellent work done by the JICA team in the limited time available.

Tokyo, November 27, 1986

27 NOV 86

J. GANGULI
General Manager (Projects)
IISCO Burnpur Works
for The Indian Team

T. Mori

TAKASHI MORI
Leader of the Feasibility Study
Mission, JICA

LIST OF PARTICIPANTS

INDIAN SIDE:

INDIAN IRON AND STEEL CO., LTD.

Mr. M.F. Mehta, Managing Director

Mr. J. Ganguli, General Manager (Projects), Burnpur Works

Mr. M.S. Chawla, Deputy General Manager (Iron and Steel), Burnpur Works

STEEL AUTHORITY OF INDIA LTD.

Mr. H. Bandyopadhyay, Additional Director (Project Evaluation)

Metallurgical and Engineering Consultants India Ltd.

Mr. S.L. Narasimhan, Chief Engineer

JAPANESE SIDE:

JICA FEASIBILITY STUDY MISSION

Mr. Takashi Mori	: Leader
Mr. Takeo Baba	: Sub-leader
Mr. Yoshinori Ito	: Member
Mr. Toshiaki Kaneko	: Member
Mr. Hisanori Ushikubo	: Member
Mr. Kenichiro Yoshino	: Member
Mr. Shinya Ueda	: Member
Mr. Hiroshi Akedo	: Member
Mr. Moriichi Enokito	: Member
Mr. Tetsuaki Kumasaki	: Member
Mr. Itsuo Nozawa	: Member
Mr. Hideyuki Yoshii	: Member
Mr. Yasuhiko Takashi	: Member
Mr. Akinori Gomi	: Member
Mr. Shunichi Hiraki	: Member
Mr. Akira Kanai	: Member

ANNEX I

SALIENT FEATURES OF THE PRESENTATION MADE BY THE JICA TEAM ON MODERNIZATION OF IISCO

(It should be reffered to the interim report presented by the Japanese side during the discussion.)

1. Based on the area available, the shape of the land and underground coal reserve, the ultimate capacity of Bumpur works is assesed at 2.0 MT of crude steel per year.

2. The product mix has been based on data provided by SAIL. This considers non-flat products.

3. The modernized plant will reach a production level of 1.0 MT and 2.0 MT after 5 years and 8 years from the date of go ahead when Indian government will authorize respectively.

4. The modernization plan studied by the Japanese side was on the condition that although the existing facilities were to be utilized effectively, the goal was to establish the 2 million tonne production system as soon as possible. Therefore, the one million tonne stage forms only a transition phase (3 year) to the 2 million tonne stage. Therefore, there can be seen no significance in making financial and economic analysis at the one million tonne stage of the present plan. (Facilities specifications and material balance, etc. at the one million tonne stage as a transition phase differ completely from those which would have been considered for a plan with the final production goal of one million tonnes.)

5. The facilities considered for transitional phase of 1.0 MT are as follows:

   a) New raw material handling plant.

   b) One 210 m^2 sinter machine.

   c) One new 2,300 m^3 Blast furnace (Phasing out of 1 x 500 m^3 and 2 x 1170 m^3 blast furnaces).

d) New BOF shop 1/2 x 130 T vessel with CC & ingot casting facilities and new stripper yard.

e) A continuous casting plant with 1 x 3 strand bloom caster
1 x 8 strand billet caster.

f) A new bar and section mill of 0.6 MT capacity producing at 0.254 MT in 1st stage (phased out light structural mill)

g) One rotary lime kiln and two oxygen units of 10,000 NM^3/Hr. each.

6. Additional facilities considered for 2 million tonne stage are as follows:

a) One sintering machine of 210 m^2.

b) One new coke oven battery with 92 ovens (48 m^3 each).
(Existing No. 7 and No. 10 batteries being phased out.)

c) One blast furnace 2,300 m^3.

d) One additional BOF vessel in the BOF shop.

e) 2 x 6 strand billet casters.

f) One bar and section mill of 0.6 MT capacity.
(Sheet mill is phased out.)

g) One rotary lime kiln and third oxygen unit of 10,000 NM^3/Hr.

7. The investment cost was estimated as below.

1st phase	–	Rs. 134,511 lakhs.
2nd phase	–	Rs. 123,505 lakhs.
Total		Rs. 258,016 lakhs.
		(Excluding IDC, including Tariff)

8. Financial analysis

IRR – (Financial) – 3.7 % (before Tax)

IRR – (Economic) – 8.44%

Sensitivity analysis of various cases was also presented to the Indian side.

9. Construction schedule

5 years for phase I and 3 years for phase II.

Total 8 years from the date of go ahead when Indian government will authorize.

10. The financial and economic viability as well as the specific investment can be improved if the import duty is waived.

11. Construction of 2 x 60 MW power plant was excluded from the Japanese plan because it expected supply from D.V.C. and it involved a vast initial investment. As the results of discussion, it will be included in the capital investment as the Indian side requested it strongly. Japanese side, however, strongly pointed out that financial and economic viability may be affected by introducing the power plant.

ANNEX II

OBSERVATIONS MADE BY THE INDIAN TEAM ON INTERIM REPORT

1. In an attempt to improve the viability of the proposal, the possibility of rationalization of the investment may be examined.

2. There is a scope to review the facilities to be provided in different phases and their technological parameters and optimum utilization of existing facilities may be reviewed to improve the profitability.

3. In view of major cost implication, the decision on continuity with the operation of existing blast furnaces vis-à-vis setting up of new blast furnaces should be based on techno-economic analysis.

4. The depreciation rate may be adopted as 7½% and 10%.

5. The logistics limitation in setting up of new coal handling system should be considered.

6. 8 strand billet caster proposed may be difficult to operate.

7. Provision of captive power plant is considered necessary under relevant conditions.

8. Use of special wagons for receipt of raw materials as suggested may be limited.

9. 100% B.F. slag to be granulated in cast house in the new furnaces.

10. Technology upgrading through selective coal crushing, PHOSAM process, hot metal pretreatment, combined blowing in BOF converters, ladle metallurgy, computer control, etc. should be kept in view.

11. Cost of antipollution measures to be indicated separately.

1-4. Dispatch of a mission to explain the draft final report

For giving explanation on the draft final report, JICA dispatched a mission to India from March 18 to 25, 1987. The mission explained the details of the report to Department of Economic Affairs, Ministry of Finance, Department of Steel, Ministry of Steel, Mines & Coal and SAIL of India, and signed minutes between SAIL and Ministry of Steel, Mines & Coal on March 24, in which it was agreed between JICA and India that the final report will be submitted by the end of June, 1987. (A list of members and schedule of the mission, a list of persons whom the mission met, and minutes of meeting, etc. are given later.)

- The Japanese side expressed its intention that the presentation of the draft final report to India would complete the task of the F/S team and no major changes in the report are expected. The Indian side agreed and at the same time expressed its gratitude to the Japanese side for the efforts which the latter had made in preparing the report.

- At the meeting with SAIL which lasted for two days, various questions were raised and answered on the details of the report, and SAIL made requests about the following seven items that certain additions and supplements be incorporated in the final report, to which the Japanese side replied that it would make efforts to meet the expectations as much as possible.

(1) Coke yield, coke balance and possibility of reducing the number of ovens in the new battery.

(2) Adequacy of the existing facilities for adoption of 100% coal tar firing in existing power plant.

(3) Reference list of combined cycle power plant with low C.V. gas.

(4) Confirmation that the new bar mill can roll carbon steels and low alloy steels and would indicate the rolling rates for different sections.

(5) Confirmation on the commencement and repayment schedule for interest and principal on the exim bank loan.

(6) The impact on the capital cost/ profitability if the interest rate on the short-term for working capital is enhanced to 18% from 14%.

(7) To confirm if the BOF convertors have the facilities of combined (top and bottom) blowing and the oxygen plants are provided with argon separation.

As regards the above items, the ideas of the study team are given in this final report.

A List of Members of Explanation Mission

Leader	Mr. Takashi MORI
Sub-leader & Technical coordination	Mr. Takeo BABA
Blast furnace	Mr. Hisanori USHIKUBO
BOF furnace	Mr. Ken-ichiro YOSHINO
Rolling	Mr. Hiroshi AKEDO
Financial analysis	Mr. Hideyuki YOSHII
Market analysis	Mr. Yasuhiko TAKASHI
Economic analysis	Mr. Akira KANAI
Secretary	Mr. Joichi KOIDE
Coking coal	Mr. Motohiko KATO
Planning & coordination	Mr. Kuniaki NAGATA

Itinerary of Explanation Mission

1987

March 18 (Wed.)	Lv. Tokyo
19 (Thu.)	Ar. New Delhi
20 (Fri.)	Explanation to Ministry of Finance & Ministry of Steel, Mines & Coal
21 (Sat.)	Explanation to SAIL
23 (Mon.)	-"-
24 (Tue.)	Signing of minutes with SAIL and Ministry of Steel, Mines & Coal
	Report to Japanese Embassy in New Delhi and JICA New Delhi Office
25 (Wed.)	Lv. New Delhi & Ar. Tokyo

List of the Persons whom the JICA Mission met during the Presentation of Draft Final Report

(Department of Economic Affairs, Ministry of Finance)

Mr. G.M. Pillai	Deputy Secretary
Mr. Dilip Rath	Under Secretary
Mr. Balwant Singh	Section Officer

(Department of Steel, Ministry of Steel and Mines)

Mr. R.P. Khosla	Secretary
Mr. Tirlochan Singh	Joint Secretary
Mr. B.S. Rama Swamy	Additional Secretary, Financial Advisor
Mr. Mridul Jain	Under Secretary

(SAIL-Steel Authority of India Limited)

Mr. V. Krishnamurthy	Chairman
Mr. S.R. Jain	Vice Chairman (Projects)
Mr. V.P. Mittal	Executive Director (Engg. & Tech.)
Mr. S.K. Roy	Executive Director (Operations)
Mr. S.K. Gupta	Director (Research & Development)
Mr. V. Ramanujachari	Director (Finance)
Mr. T.T. Joseph	Director (Projects)
Mr. S.K. Ahluwalia	Director (Commercial)
Mr. M.R.R. Nair	Director (Personnel)
Mr. A. Pande	Director (Corporate Planning)
Mr. H. Bandyopadhyay	Joint Director (Project Evaluation)
Mr. K.C. Agarwal	Joint Director (Engg. & Tech.)
Mr. M.N. Bagchi	Joint Director (Engg. & Tech.)
Mr. S.C. Susi	Sr. Deputy Director (Centre for Engg. & Tech.)
Mr. S.K. Kashyap	Sr. Deputy Director (Project Evaluation)
Mr. Balram Singh	Deputy Director

(SAIL) (Cont'd)

Mr. A. Sinha	Deputy Director
Mr. J.C. Sinha	Additional Director (Projects)
Mr. R. Jambunathan	Additional Director (Finance)
Mr. R. Chakraboty	Additional Director (Power)
Mr. N.N. Sen	Deputy Chief Engineer (Projects)
Mr. T.D. Chattajee	In charge (Research & Development)
Mr. H. Sen	Deputy Chief Manager (Finance & Accounts)
Mr. P.K. Ganguly	Addl. Chief Engineer (Civil)
Mr. Mahesh Babu	Executive (Chairman's Office)
Mr. S.N. Khemka	Sr. Manager
Mr. S.R. Sehgal	Sr. Manager
Mr. J.D.M. Nagpal	Sr. Manager (Corporate Planning)
Mr. P.K. Asthave	General Marketing Manager
Mr. R.K. Gupta	Manager (Finance)
Mr. S.N. Srivastara	Manager
Mr. D.C. Geol	Manager
Mr. S. Banerjee	Deputy Chief (Market Research)

(IISCO-Indian Iron & Steel Co., Ltd.)
(BURNPUR Works)

Mr. M.F. Mehta	Managing Director
Mr. J.C. Sinha	General Manager (Projects)
Mr. J. Ganguli	General Manager (Projects)
Mr. M.S. Chawla	Deputy General Manager (Iron & Steel)
Mr. S.K. Mukherjee	Deputy General Manager

MINUTES OF THE MEETING BETWEEN JICA FEASIBILITY STUDY MISSION AND SAIL FOR DISCUSSION ON DRAFT FINAL REPORT OF FEASIBILITY STUDY ON THE MODERNI SATION OF BURNPUR WORKS OF INDIAN IRON & STEEL COMPANY LIMITED IN INDIA.

1. For the feasibility study on the modernisation of Burnpur Works of Indian Iron & Steel Company Limited the JICA Study Mission visited India in June-July 1986 for about a month field study and after about three months work in Japan prepared an interim report. This interim report was discussed by the JICA feasibility study mission with an Indian team who visited Japan for the purpose in November 1986. During the discussions the Indian team made a few observations on the interim report and requested for a review of the capital investment and others for obtaining the maximum benefit with investment of limited funds. As a result of further intensive work JICA presented a draft final report on feasibility study for modernisation of Burnpur Works of Indian Iron & Steel Company Ltd. in India in March 1987.

2. The feasibility study mission visited India from 19th March to 24th March 1987. A presentation was made at SAIL on 21st March 1987. Chairman, SAIL alongwith the functional Directors and other senior officers of SAIL and IISCO participated, during the presentation. A list of participants is attached hereto. (Annexure-I).

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3. In his presentation, Mr. T. Mori, leader of the feasibility study mission elaborated the background of the study, the past performance and the need for modernisation of IISCO Burnpur Works and the outline of the modernisation plan drawn by the feasibility study mission. He explained that the study was based on the following premises:

(1) Based on the discussion between JICA preparatory study team and the Indian counterpart, production capacity of 2 to 2.5 million tonnes per year in terms of crude steel was made the target for the Works. And it was also decided that blast furnace - basic oxygen furnace process was to be adopted as production method to achieve the target.

(2) A tract of land owned by IISCO and adjacent to existing facilities of the Works was considered as the site for modernisation of the Works.

(3) As a result of discussions with the Indian counterpart based on the steel demand and supply forecast provided by SAIL, it was decided that the study be made with the Works' product-mix being centered on non-flat, or long products.

In view of the limited space of the Works and also for effective utilisation of existing facilities, the team considered it more advantageous that the Works produces mainly non-flats as at present.

(4) The target in productivity and level of production technology was that it be not inferior to that of other steel plants in India and as close as possible to international standards.

(5) Prices of imported equipment were estimated on the basis of domestic purchasing prices in Japan. Prices of those to be purchased in India were estimated based on Indian prices where unit price was provided by the Indian side and on Japanese domestic prices where Indian unit price was not available.

(6) As data and information necessary for the F/S could not be obtained adquately because of the limitation of time for field survey and others, the F/S had to be made by setting some preconditions or assumptions at stages of the study work in Japan.

(7) Financial analysis was made on the assumption that the accumulated deficit of IISCO at present has no effect on the financial accounting under consideration.

Mr. Mori concluded that with the presentation the task of feasibility study mission is complete and no major change is expected.

4. The sub-leader of the feasibility study mission, Mr.T. Baba then explained the technical and technological aspects of the report. The report as presented envisaged modernisation of IISCO in two steps of production build-up. In the first step, it is proposed to achieve a production rate of 1 million tonne of

..../-

crude steel per year and in the second step the final capacity of the plant of 2.15 million tonnes of crude steel per year will be achieved. The total modernisation work would be completed in $6\frac{1}{2}$ years where the first step would be completed in $5\frac{1}{2}$ years. The total estimated cost at the final step was indicated as Rs. 2449 crores with a foreign exchange component of Rs. 888 crores. The financial IRR after modernisation was indicated as 7.11% after tax and 9.85% before tax and economic IRR was 15.4%.

5. The thrust of the modernisation measures had been on:

- Improvement in productivity;
- Quality of products at every level through efficient process control;
- Improvement in the consumption norms of all feed materials and other inputs;
- Conservation of energy;
- Improvement in the pullution control measures to improve the environment both at the working place as well as the surrounding atmosphere.

6. Finally, it was concluded by the feasibility study mission that the project profitability and economic viability need maximum effort from IISCO and a strong support from Government of India. The mission further stressed that if it is decided to continue operation of IISCO, the modernisation scheme has to be started early and completed quickly. The mission strongly recommended that measures should be taken for providing tax incentive to IISCO with a view to reduce the capital cost and improve the profitability alongwith selection of most cost effective

financing source.

7. Against a query from Chairman, SAIL, the mission explained that the rough specific investment per tonne of annual capacity works out to $1000 to $1100, as against $1500 normally for a 2.0 Mtpa plant with similar product-mix in a greenfield site (as an example).

8. The mission clarified that the product mix adopted by them has been based on the demend availability analysis given by SAIL. Apart from the demand gap, the mission further mentioned that in their view IISCO plant was considered more sultable for long products in view of the layout, space constraint, and economic size than for a hot strip mill.

9. The mission also clarified that the rates prevalent in India for plant and equipment compare reasonably with Japanese home price.

10. During detailed discussion Feasibility Study Mission gave clarifications on the issues raised by SAIL/ IISCO. SAIL/IISCO highly appreciated the quality and content of the report.

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11. It was agreed that the final report will be sent by JICA in the end of June 1987. The final report will include the clarifications to the issues listed in Annexure-II to the extent possible.

24-3-87

(S.R. JAIN)
Vice-Chairman
(Projects) , SAIL

24-3-87

(T. MORI)
Leader, JICA Mission

ANNEXURE-I

LIST OF PARTICIPANTS

JICA FEASIBILITY MISSION

Mr. Takashi MORI	Mission Leader
Mr. Takeo BABA	Sub Leader,Technical Coordination
Mr. Hisanori USHIKUBO	Iron Making (Blast Furnace)
Mr.Kenichiro YOSHINO	Steel Making(Converter)
Mr. Hiroshi AKEDO	Rolling
Mr. Nideyuki YOSHII	Financial Analysis
Mr. Yasuhiko TAKASHI	Market Analysis
Mr. Akira KANAI	Economic Analysis
Mr. Joichi KOIDE	Secretary
Mr. Motohiko KATO	Coking Coal
Mr. Kuniaki NAGATA	Planning and Co-ordination
Mr. T. HIRAI	JICA Representative, Embassy of Japan.

STEEL AUTHORITY OF INDIA LTD.

Mr. V. Krishnamurthy	Chairman
Mr. S.R. Jain	Vice-Chairman(Projects)
Dr. G. Mukherjee	Adviser
Mr. V.Ramanujachari	Director(Finance)
Mr. S.K. Ahluwalia	Director(Commercial)
Mr. M.R.R. Nair	Director(Personnel)
Mr. A. Pande	Director(Corporate Planning)
Mr. T.T. Joseph	Director(Projects)
Mr. S.K. Roy	Director(Operations)
Mr. V.P. Mittal	Executive Director(E&T)
Mr. H. Bandyopadhyay	Additional Director(PE)
Mr. J.C. Sinha	Additional Director(Projects)
Mr. R. Chakraborty	Additional Director(Power)
Mr. R. Jambunathan	Additional Director(Finance)
Mr. Babu G Mahesh	Executive
Dr. S.K. Gupta	Director(RDCIS)
Mr. M.F. Mehta	Managing Director,IISCO
Mr. J. Ganguly	General Manager(Proj),IISCO
Mr. M.S. Chawla	Dy.General Manager(I&S),IISCO

ANNEXURE-II

ISSUES WHICH WOULD BE REVIEWED/FURTHER CLARIFIED IN THE FINAL REPORT.

1. Coke yield, coke balance and possibility of reducing the number of ovens in the new battery.

2. Adequacy of the existing facilities for adoption of 100% coal tar firing in existing power plant.

3. Reference list of combined cycle power plant with low C.V. gas.

4. Confirmation that the new bar mill can roll carbon steels and low alloy steels and would indicate the rolling rates for different sections.

5. Confirmation on the commencement and repayment schedule for interest and principal on the exim bank loan.

6. The impact on the capital cost/ profitability if the interest rate on the short-term for working capital is enhanced to 18% from 14%.

7. To confirm if the BOF convertors have the facilities of combined (top and bottom) blowing and the oxygen plants are provided with argon separation.

Record note of discussions held on 20.3.1987 in Department of Steel under the Chairmanship of Shri R.P. Khosla, Secretary(Steel) on Draft Final Report on Feasibility Study for the modernisation of Burnpur Works of IISCO.

The list of persons who attended the meeting is at Annexure I.

As per Agreement signed on 7th March, 1986 between Government of India and Japan International Cooperation Agency, the draft final report on Feasibility Study for the modernisation of Burnpur Works of IISCO has been prepared by JICA. This was received by Department of Steel on 12th March, 1987. This Report was discussed between Department of Steel and JICA on 20.3.1987.

Shri R.P. Khosla, Secretary, Department of Steel, extended a warm welcome to all members of JICA and complimented them on the comprehensive study made by them on modernisation of IISCO.

Mr. Takashi Mori, Leader of the JICA Mission presented the Report and explained the main assumptions, conclusions and recommendations of the Team.

During the discussions that followed Mr. Mori's presentation, the JICA Team gave the following clarifications:-

1) The investments required for the quantity and quality of iron ore necessary for increased production and productivity was outside the scope of their Feasibility Study. They, however, clarified that high grade iron ore will be necessary from outside sources for blending with the low grade iron ore of IISCO mines to attain the required quality.

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2) Sinter charge will be 70% and for the two new sinter plants, fine ore from Gua mines can be used. The investment of washing and reclaiming this ore was outside the scope of their Feasibility Study.

3) JICA confirmed that for projected coke rate and blast furnace productivity to be achieved a level of 17% ash in coal blend would be required.

4) JICA confirmed that with the present level of casting and rolling technology the production of flat products after modernisation will be an uneconomic proposition owing to the extremely high capital cost of installing a hot strip mill. The minimum economic size of a Hot Strip Mill would be approximately 2 to 3 million tonnes. If special steels like stainless steel are to be rolled, mills of .7 mt or .8 mt can be alternative technologies such as 'stackle mill' [illegible] which involved lower capital costs.

5) Apart from the projected demand of long products in India given to them by SAIL, JICA study has recommended long products as modernisation had to be done within the existing boundaries of the plant which would not allow putting up of flat product mills.

6) The profitability of IISCO after modernisation had been calculated only for the complete project. The first step was only one stage in the implementation of the project and therefore no profitability calculations had been done for this stage. If the plant was to be modernised only at a capacity of 1.0 MT, a separate technical proposal would have to be prepared. However, prima facie it appeared that a one million tonnes plant based on the BF BOF route would not be economically viable.

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7) JICA explained that production costs were based on wages of the proposed 14000 employees at wage levels existing in 1986, material and operations costs as existing in 1986. Depreciation rate was on the assumption that most of existing facilities would be completely depreciated by the start up of the project and only the balance assets had been taken into consideration while working out depreciation.

8) JICA confirmed that the project of modernisation could be implemented on a turn-key basis by a single executing agency. Some of the Japanese steel companies had experience of this type of work.

9) JICA had assumed the Japanese EXIM Bank rate of lending of 5.6% for calculations. However, the Indian side was free to avail of any alternative source of financing.

10) JICA Team stressed the need of an early decision to modernise the plant.

The Indian side made the following observations:-

1) Certain inevitable investments for example for raw materials, would have to be considered along with the investments recommended by JICA.

2) The import duty on equipment had increased from 55% to 85% and this would also have to be provided.

3) The exchange rate between the Yen and Rupee had changed in favour of the Yen from Yen13.25 assumed by JICA to Yen 11.

4) The Indian side had taken note of JICA's recommendation that even at 55% import duty, the customs duties and taxes forming 18% of the project cost were very high and cast a heavy financial burden on the project. The Japanese recommendation that financial incentives should be given to the project was also noted.

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5) It was also noted that from the 1986 cost of production of IISCO at Rs.6588 per tonne, the investments recommended by JICA would enable production at Rs.3117 per tonne after modernisation.

(Tirlochan Singh)
Joint Secretary
Department of Steel
Government of India

(Takashi Mori)
JICA Mission Leader

New Delhi - March 24, 1987.

ANNEXURE - I

LIST OF PERSONS WHO ATTENDED THE MEETING TAKEN BY SECRETARY(STEEL) ON 20.3.1987.

INDIAN SIDE

1. Shri R.P. Khosla,
   Secretary(Steel).
2. Shri B.S. Ramaswamy,
   AS&FA(Steel & Mines).
3. Shri Tirlochan Singh,
   Joint Secretary(Steel)
4. Mrs. Mridul Jain,
   Under Secretary(Steel).
5. Shri S.R. Jain,
   Vice-Chairman(Projects),
   SAIL.
6. Shri M.F. Mehta,
   Managing Director, IISCO.
7. Shri J. Ganguly,
   General Manager(Projects),
   IISCO.
8. Shri N.N. Sen,
   Deputy Chief Engineer(Projects),
   IISCO.

JICA

1. Mr. Takashi Mori,
   Mission Leader.
2. Mr. Takeo Baba,
   Sub-Leader, Technical Coordination
3. Mr. Hisaneri Ushikubo,
   Iron Making(Blast Furnace).
4. Mr. Kenichiro Yoshino,
   Steel Making(Converter).
5. Mr. Hiroshi Akedo,
   Rolling.
6. Mr. Hideyuki Yoshii,
   Financial Analysis.
7. Mr. Yasuhiko Takashi,
   Market Analysis.
8. Mr. Akira Kanai,
   Economic Analysis.
9. Mr. Jeichi Koide,
   Secretary.
10. Mr. Motohiko Kato,
    Coking Coal.
11. Mr. Kuniaki Nagata,
    Planning and Coordination.

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Chapter 2

Matters related to the study

Contents

Main Data for India

		(Source)
Land Area	3,287,000 km²	4
Resources	Coal, Iron Ore, Manganese, Bauxite, Petroleum	1
Population	761 million (as on 1st March 1986)	2
Capital City	New Delhi (Population 5.7 million as on 1981)	4
Main Cities	Calcutta (Population 9.2 million), Bombay (8.2 million), Madras (3.3 million), Bangalore (2.9 million),	
	Hyderbad (2.1 million)	4
Languages	Hindi (Official Language), English (Sub-official Language), 14 Provincial Languages	4
Religions	Hinduism, Islam, Christianity, Sikhism, Buddhism etc.	1
Regime	The Republic (22 States+2, 9 Union Territories)	2
Constitution	Established on 26th November 1949	4
the Sovereign	the President (GIANI ZAIL SINGII)	4
Parliament	Bicameral (Raiya Sabha=the House of Lords 244 Seats, Lok Sabha=the House of Commons 544 Seats)	4
Political Parties	Indian National Congress (Ruling Party of Central Government, President (RAJIV GANDHI, Prime Minister)	4
	Telugu Desam	
	Communist Party of India-Marxism	
	All India Anna Dravida Munnetra Kazhagam	
	etc.	
G D P	1,934 billion Rupees (1984/85, factor cost)	2
GDP per Capita	2,616 Rupees (1984/85)	2
Currency	Rupee (1 Rupee=100 Paisa, 1 Lakh=100,000 Rupees, 1 Crore=100 Lakhs)	4
Exchange Rate	12.533 Rupees per 1 US Dollar (as on end of June 1986)	3
Outlay & Revenue	Total Outlay 732 billion Rupees, Current Revenue 478 billion Rupees (1984/85)	1
Fiscal Year	from April to March	4
Reserves	6,960 million US Dollars (as on end of April 1986, excluding Gold)	3
Foreign Trade	Exports 116 billion Rupees (Crude Oil, Precious Stones, Garments, Engineering Goods, Tea, Iron Ore)	1
	Imports 171 billion Rupees (petroleum and Petroleum Products, Machinery and Transport Equipments,	
	Precious Stones, Edible Oils, Iron and Steel) (1984/85)	1
Main Agricultural Products	Rice, Wheat, Tea, Sugar, Cotton, Jute	1

Source:
1. Economic Survey 1985-86, Government of India
2. Seventh Five Year Plan 1986-90, Government of India, Planning Commission
3. International Financial Statistics, International Monetary Fund
4. World Manual 1986, Kyodo News Service

2. Matters related to the study

2-1. General economic situation

2-1-1. Outline of economy under the Sixth Five Year Plan

Overall economic growth in the Sixth Five Year Plan from April 1980 to March 1985 achieved the target. Agriculture and service sectors showed growth higher than the targets, but mining and manufacturing secotrs' growth was much lower than the targets.

Table 2.1.1 Sixth Five Year Plan Growth Rates:
(Value Added, Percent per annum)

	Targets	Actuals (anticipated)
Agriculture	3.8	4.3
Mining & manufacturing	6.9	3.7
Other sectors	5.5	6.6
Total	5.2	5.2

Source: Seventh Five Year Plan 1986-90
Government of India

The successful growth in the agriculture sector was due to an increase in the harvests resulting from a nationwide spread of "Green revolution" to eliminate poverty, advance in irrigation and use of chemical fertilizers. On the other hand, the failure of industry sectors to achieve the growth targets resulted from the fact that the facilities in basic industries such as steel, cement and textile were not used effectively. It may be mentioned also that the industry sectors lack international competitiveness in production cost, technical level, quality and design of products and could not increase their export.

During the period, however, some technological progress was observed, namely, computer NC machine tools, LSI chips and cars with good fuel consumption were produced; cement

plants with capacity of 3,000 tonnes a month and 500,000 kW power station were constructed; 3,000 tonne freight trains were put into service; and telegraphic transfer service was commissioned for the first time. The scope of computer use also expanded and improvement in energy saving and yield was observed at petroleum refining and petrochemical plants. And energy production showed annual compound growth rate of 12% in terms of coal equivalent, including increased production of crude oil from 12 million tonnes in 1979 to 29 million tonnes in 1984.

However, the Indian living standard was low as indicated by per capita GDP and consumption spending being Rs.2,616 and Rs.1,979, respectively, in 1984, and the percentage of population below the poverty line shows a high level of 37%. In addition, because of inadequate supply of drinking water and delay in improvement of public hygiene, average life expectancy of the people is still at the level of 56 to 57 years old.

Table 2.1.2 Trends in Percentage of People Below Poverty Line

Percentage of population below the poverty line	1977-78	1983-84 (Provisional data)
Rural	51.2%	40.4%
Urban	38.2	28.1
Total	48.3%	37.4%

Source: Seventh Five Year Plan

(1) Infrastructure

In India, coal, electric power, petroleum, railway and port are considered as infrastructure. Outline of those infrastructure in the period of the Sixth Five Year Plan was given below.

a. Coal

Though affected by floods, electric power shortage, and failure of machinery and equipment, production of coal in 1984 reached 147 million tonnes, showing 7.2% growth per annum. It was pointed out that it should have been more if good labor-management relation was maintained.

In supply side, due to mismatching of transportation plan including trains, pithead stockpile recorded 29 million tonnes, exceeding the guideline of one-month production, in March 1985. Coal quality was tested by several committees, and it has been pointed out that strong coking coal for steel industry is high in ash content and low in coking properties and that chemical, cement and glass industries are not using coal of suitable quality. At pitheads, mechanization has progressed for crushing, sizing and loading, and the quantity handled by those machinery now accounts for 68% of the total.

Table 2.1.3 Trends in the Coal Sector

	1979/80	1984/85	1980-85
	Million tonnes		Percent*
Production	103.9	147.4	7.2
Pithead stocks (year end)	14.0	29.2	15.8
Despatches	99.6	135.1	6.3

* Annual compound growth rate

Source: Economic Survey 1985-86, Government of India

b. Electric power

Power generation showed growth of 8.5% per annum and reached 157 billion kWh in 1984. The ratio of hydro-electricity : thermal electricity (including nuclear power) changed from 43:57 to 34:66. Power supply is

still short, but it was estimated that the rate of shortage improved from 16% to 6.7%. Load factor, the ratio of the total power generated to the maximum power demand, was improved from 44.3 to 50.1 for the entire India, but the load factor in West Bengal was improved slightly from 30.7 to 36.5, much lower than the national average.

Incidentally, despite the fact that power generating capacity was expanded considerably during the period, there is still shortage of power supply. It was said that this was because due to shortage of fund, 50% of the target of installation of power transmission line was not implemented.

To improve the power supply condition, it is necessary to increase transmission lines, improve quality of coal used in power stations, shorten maintenance time of power plants and modernize power machinery and equipment introduced in 70's.

Table 2.1.4 Trends in the Power Sector

Item (Units)	1979/80	1984/85	1980-85*
Power generation (Billion kWh)	104.6	157.0	8.5
Hydel	45.5	54.0	3.5
Thermal (incl.nuclear)	59.1	103.0	11.8
Plant load factor of thermal plants (%)	44.3	50.1	-
-"- (West Bengal)	(30.7)	(36.5)	-
Estimated deficit (%)	16.0	6.7	-

* Annual compound growth rate (%)
Source: Economic Survey 1985-86

c. Petroleum

Production of crude oil grew at a rate of 19.8% a year and reached 29 million tonnes in 1984, meeting 70% of domestic consumption. Oil production offshore the western coast, in particular, showed a notable rise through introduction of drilling rigs and specialized vessels or platforms. Land production showed only a small increase, but a number of oil discovery were made by exploration.

Oil refining did not reach the 1984 target of 36.8 million tonnes because Cochin refinery suffered from a fire and was closed much of the year, but showed a growth of 5.3% a year. Operating rate of refineries other than Cochine refinery was more than 90%.

Consumption of petroleum products was 38.5 million tonnes in 1984 and was estimated to be 41.6 million tonnes in 1985. Growth rate of consumption of major products as compared with that a year ago was 2.9% for naphtha as raw material for chemical industry and 2.7% for heavy oil as fuel, but paraffine oil and high speed diesel oil showed high growth of 7.9% and 10.7%, respectively.

Natural gas production increased in line with crude oil production. Its annual growth rate was 21.2% and it reached 7.2 billion cubic meters in 1984. But 43% of the gas produced offshore was left to flare off as there is shortage of compression and water separation facilities. Effective use of natural gas can be made possible by installing downstream facilities such as for LPG production.

Table 2.1.5 Trends in the Petroleum Sector

Item	(units)	1979/80	1984/85	1980/85*
Crude oil production	(Mil. tonnes)	11.77	28.99	19.8
On-shore		7.35	8.85	3.8
Off-shore		4.42	20.14	35.4
Refinery throughput	(-"-)	27.47	35.56	5.3
Natural gas production	(Bil. cubic metres)	22.76	7.24	21.2

* Annual compound growth rate (%)

Source: Economic Survey 1985-86

In addition, in order to develop new energy sources, national project for bio-gas was started in November 1981 and by 1984 356,000 plants were in operation. As a result, 1,480,000 tonnes of firewood could be saved a year and besides, 7.1 million tonnes of good compost fertilizer was produced as by-product.

d. Railways

Transportation of raw materials and supplies by rail increased at annual rate of 4.1% and in 1984 reached 236 million tonnes as planned. In individual items, coal is the largest in volume, followed by, in this order, raw materials for steel plants (excl. coal), foodgrains, mineral oils, cement, fertilizers, iron ore for exports, and pig iron and finished steel from steel plants.

Incidentally, the transportation volume originally planned for 1984 was 245 million tonnes, but it was reviewed midyear and revised to 237 million tonnes by lowering coal, raw materials for steel plants, and iron ore for exports while increasing cement and fertilizers.

Railways in India have a long history, but it was stressed that replacement of overage facilities and modernization of their operation are indispensable for improvement of efficiency and safety. Length of railways planned to be replaced in the Sixth Plan was 14,000 km, but only 9,541 km was replaced, and railways newly installed totalled 1,007 km.

Table 2.1.6 Performance of the Railway Sector

(Million tonnes)

Item	1979/80	1984/85	1980-85*
Coal	62.0	91.6	8.1
Raw materials for steel plants (excluding coal)	20.8	22.6	1.7
Pig iron and finished steel from steel plants	7.2	8.2	2.6
Iron ore for exports	9.3	11.1	3.6
Cement	10.0	16.9	10.9
Foodgrains	18.4	20.8	2.5
Fertilizers	8.2	12.2	8.2
Mineral oils	14.3	18.2	4.9
Other goods (balance)	43.0	34.9	(-)4.2
Total	193.1	236.4	4.1

*Annual compound growth rate (%)

Source: Economic Survey 1985-86

e. Ports

The plan for important ports under the Sixth Plan was completed during the period, and facilities used exclusively for handling iron ore and POL (petroleum, oil and lubricants) as well as container terminals were constructed at major ports. As a result, cargo handling capacity of major ports reached 133 million tonnes at the end of period. Of the cargoes actually handled, POL showed remarkable growth and the total increased 6.3% a year to 107 million tonnes in 1984.

Table 2.1.7 Trends in Port Traffic

(Million tonnes)

Cargo handled at major ports	1979/80	1984/85	1980-85*
POL (petroleum, oil and lubricants)	28.8	49.7	14.6
Iron ore	23.2	26.0	2.4
Other goods (balance)	26.5	31.0	3.2
Total	78.5	106.7	6.3

*Annual compound growth rate (%)

Source: Economic Survey 1985-86

(2) Industrial production

As mentioned in the Economic Survey 1985-86, Government of India, the statistics of manufacturing sector is not in order as reports by production sector units were not made for a number of statistical items for several years.

To cover the deficiency, Central Statistical Organization, CSO, is using sampling method as well as weight distribution method to prepare production indices and adjust indices of past years. The latest adjustment was made for past years since 1983 fiscal year (1985 figures from April to Novermber, Indian Fiscal Year being April to March). Growth of industrial production after index adjustment is as shown below.

Table 2.1.8 Index of Industrial Production

(Base: 1970)

Year	Manufacturing	Mining & Quarrying	Electricity	General
1984/85	5.7	8.0	12.0	6.8
1984/85 (Apr.-Nov)	6.0	8.9	12.9	7.3
1985/86 (-do-)	6.8	2.9	8.4	6.6

Figures are growth rate (%).

Source: Economic Survey 1985-86

The 1984 industrial production in general showed growth of 6.8% over the preceding year. Electricity showed the highest growth, followed by mining and quarrying, and manufacturing. The same trend is observed in the 1985 fiscal year.

The manufacturing sector accounts for 81.1% of the total industrial production. In this sector, production rose markedly of paper products, chemical products, basic metals, transportation facilities and sundry goods while production of radios, cotton cloth, sugar and medicament decreased. Incidentally production of motorcars (incl. tricycles) was 158,000 units in 1983 and 196,000 in 1984.

a. Public enterprises

Public enterprises have a considerable weight in the Indian economy. Industrial production by the public enterprises in 1984 showed growth of 7.7% over the preceding year, and that in the April- November, 1985, period showed 8.2% increase over the same period a year ago. Those which showed smaller production in 1984 were zinc, lead, gold, cement and textiles, and in 1985, production of copper, fertilizer (P_2O_5), coal and lignite decreased, and production of cement and gold showed further decline following the trend in the preceding year.

Table 2.1.9 Production in Public Enterprises

Product	1984/85 Thousand tonnes	% Change 1984-85	% Change 1985-86 (Apr.-Sept.)
Steel ingots	6,246	4.9	9.8
Saleable steel	5,283	10.7	18.8
Coal	130,810	7.7	- 2.4
Lignite	7,110	7.2	- 2.5
Aluminium	87	42.4	20.7
Zinc	51	- 5.5	12.5
Lead	14	- 8.2	10.5
Gold (Kgs	1,092)	- 8.0	- 23.5
Copper	41	16.0	- 41.3
Iron ore	7,197	21.6	9.3
Petroleum crude	28,990	11.5	3.1
Petroleum refining	35,560	0.9	21.3
Cement	19,380	- 3.6	- 2.7
Fertilizer (N)	1,845	11.1	29.0
Fertilizer (P_2O_5)	345	20.2	- 13.3
Textiles (Market yarn)	148	- 3.4	N.A.
Textiles (Cloth)(Million metres)	758	- 9.5	N.A.

Source: Economic Survey 1985-86

b. Small-scaled industry

Production by small-scaled industry in India accounts for a half of the entire Indian industrial production. The number of enterprises was 1,158,000 in 1983 and 1,275,000 as of March 1985. The amount of their production increased 21.4% from Rs.416.2 billion in 1983 to Rs.505.2 billion in 1984. They contributed also to India's export, and the amount of their exports was estimated to be Rs.23.5 billion in 1984, which is an increase of 8.8% over the preceding year.

Generally, small-scaled industry has low investments and is labour-intensive (the number of employment as of the end of March 1985 being about 9 million) and scattered over the country. As compared with big and medium sized enterprises including public enterprises, their managing attitude is very rich in enterprising initiative and much expectations are placed on their roles in future economic progress of India.

(3) Employment

The statistics shows that the number of employees as of the end of March 1985 is 186,710,000, of which organized sector-industry employs about 24.6 million, which is further divided into 17.2 million in public sector and 7.4 million in private sector. As compared with that in the preceding year, employment in public sector showed an increase of 1.98% and that in private sector rose 0.78%. Overall increase of employment in the organized sector-industry was 1.62%.

Table 2.1.10 Employment in the Organized Sector-Industry
(As on End of March)

(Thousand persons)

	1980	1984	% Change* 1980-84	1985*	% Change 1984-85
Public sector	15,078	16,866	1.03	17,200	1.98
Private sector	7,227	7,343	1.00	7,400	0.78
Total	22,305	24,209	1.02	24,600	1.62

* Annual compound growth rate

* Figures for 1985 are provisional.

Source: Economic Survey 1985-86

Table 2.1.11 Employment in the Organized Sector by Industry

(Thousand persons)

Classification*	Public Sector 1983	Public Sector 1984	Private Sector 1983	Private Sector 1984
Agriculture and hunting, etc.	476	489	847	819
Mining and quarrying	884	927	120	113
& 3. Manufacturing	1,634	1,717	4,626	4,473
Electricity, gas and water, etc.	721	732	37	39
Construction*	1,120	1,119	68	66
Wholesale and retail trade, etc.	118	124	275	276
Transport, storage and communications	2,826	2,864	59	57
Financing, insurance and real estate, etc.	872	913	207	214
Community, social & personal services	7,806	7,980	1,283	1,288
Total	16,456	16,866	7,522	7,343

*The National Industrial Classification has been introduced in 1975.
*Coverage in construction, particularly on private account, is known to be inadequate.
*Relates to non-agricultural establishments in the private sector employing 10 and more persons.

Source: Economic Survey 1985-86

In the meantime, according to the registration at the Employment Exchange, the number of persons seeking jobs as of the end of March 1985 was 23.92 million, 5.8% more than that a year ago, and the number as of the end of August 1985 increased to 25.37 million.

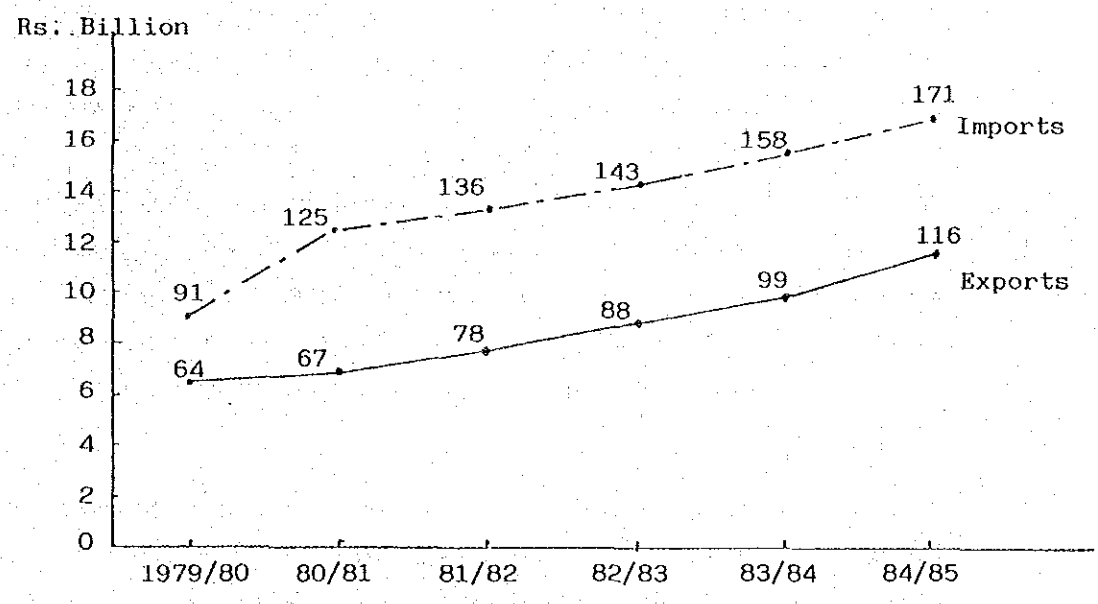
(4) Labour-management relations

In order to keep harmonious relations between labour and management, the Government makes efforts toward decision of reasonable wages, improvement of working condition, disposal procedure of grievance and mediation on labour disputes. In addition, revision is being made on Labour Law which is considered out-of-date under the present condition so that the interests of workers may be better protected.

Workers' participation in the management is already in effect at the public sector and acts as a useful tool in improving productivity and correcting unfair labour practices. It is planned to introduce the systme into the private sector as well. For implementing the system it was stressed that not a leader from a trade union who is not an employee but a worker should represent their interests directly.

(5) Foreign trade

Foreign trade of India increased considerably under the Sixth Plan, exports and imports showing annual growth rate of 12.5% and 13.3%, respectively, on rupee basis. Though trade deficit increased from Rs.27.2 billion in 1979 to Rs.58.4 billion in 1980, but since then it was kept at a level to 1984. On dollar basis, the growth of exports and imports is 4.2% and 5% a year, respectively.



Source: Ministry of Finance, Economic Division

Fig. 2.1.1 Exports and Imports

The reason why the trade deficit was kept in a certain limit since 1980 lies to a large extent in the fact that import of petroleum products decreased due to increased production of crude oil and progress of petrochemical industry.

The production of crude oil increased from 12 million tonnes in 1979 to 29 million tonnes in 1984, and the share of import of POL (petroleum, oil and lubricants) in their domestic consumption fell from 71% in 1980 to 31% in 1984.

a. Imports

In the trend of imports by item from 1982 to 1984, POL occupied the largest weight, but their share in the total amount of imports decreased from 39.3% in 1982 to 31.5% in 1984. On the other hand, because of increasing trend of capital investment and also because introduction of high technology was necessary for modernization of industries and infrastructure, import of capital goods increased, and their share in the total import amount remained at 19-16%. Other changes in the share to be noted are fertilizers and fertilizer materials whose share increased from 2.6% in 1982 to 5.7% in 1984 and edible oil whose share increased from 2.8% to 4.9%. Items which showed drop in share are iron and steel, and cereals and cereal preparations.

The decrease of share of iron and steel reflects that supply of electric power and coal increased and that supply of finished products conforming to the demand increased. However, their imports during the April-September, 1985, period showed an increase of 41% as compared with that in the same period a year earlier.

Pearls and precious stones showed a large weight in the imports.

Table 2.1.12 Composition of Imports

	1982/83	1984/85
	(Per cent)	
Petroleum, oil and lubricants	39.3	31.5
Capital goods	19.0	16.1
Pearls, precious and semi-precious stones, etc.	5.1	6.0
Fertilizers and fertilizer materials	2.6	5.7
Edible oil	2.8	4.9
Iron and steel	8.2	4.5
Chemical elements and compounds	3.0	4.5
Cereals and cereal preparations	2.6	1.0
Others	17.4	25.8
Total	100.0	100.0
(Billion rupees)	(143)	(171)

Source: Ministry of Finance, Economic Division

As for sources of imports, OECD countries held the highest share, about a half of the total, followed by OPEC and non-OPEC developing countries. U.S.S.R. also held a considerable share and the other East Europe countries had a stable, though small, share. Among the OECD countries, U.S.A., Federal Republic of Germany, Japan and U.K. are major exporters to India. Notable change in this respect is that the imports from OPEC decreased while non-OPEC developing countries increased their exports to India.

Table 2.1.13 Sources of Imports

	1982/83	1984/85
	(Per cent)	
U.S.A.	10.0	9.8
Federal Republic of Germany	5.8	7.6
Japan	7.6	7.3
United Kingdom	6.4	6.1
Other OECD and EEC countries	17.9	18.2
U.S.S.R.	9.9	10.5
Other East Europe	2.1	2.2
OPEC	27.3	19.2
Developing countries (Non-OPEC)	12.6	18.2
Others	0.4	1.0
Total	100.0	100.0
(Billion rupees)	(143)	(171)

Source: Ministry of Finance, Economic Division

b. Exports

Trend of exports by item from 1982 to 1984 shows that crude oil overtook agro-based commodities in the export share and became the largest export item. Of items other than crude oil, ready-made garments and tea increased their shares while engineering goods, agricultural and marine products decreased their shares.

Table 2.1.14 Composition of Exports

(Per cent)

	1982/83	1984/85
Crude oil	12.1	13.5
Pearls, precious and semi-precious stones	10.8	9.5
Eight important agro-based commodities	13.3	8.9
Ready-made garments	6.2	7.4
Engineering goods	9.1	6.4
Tea and mate	4.2	6.1
Iron ore	4.3	3.9
Leather and leather manufactures (including footwear)	4.5	4.0
Marine products	4.1	2.9
Others	31.4	37.4
Total	100.0	100.0
(Billion rupees)	(88)	(116)

Source: Ministry of Finance, Economic Division

Export of crude oil increased by one milion tonnes in 1984 to 6.5 million tonnes a year. However such rise of crude oil export resulted from shortage of refining capacity at home, and it is said that further increase cannot be expected as refining capacity will increase after the second half of 1985.

Farm products (consisting of eight items of coffee, oil cake, tobacco, nuts, spices, sugar, raw cotton and rice) tend to decrease due to competition from other developing countries.

In 1984 23.5 million tonnes of iron ore was exported, and the highest annual record so far is 24.8 million tonnes in 1979.

Weight of export of precious stones, etc. is high, but net receipts of foreign exchange from the export of precious stones are not much because diamonds, for example, are exported by importing and processing most of rough diamonds.

Distribution of exports by country is very similar to the pattern of sources of imports. Exports to OECD countries account for 45% of the total exports, and then U.S.S.R. and other East Europe, non-OPEC developing countries and OPEC countries come to have some weight in the exports. By country, U.S.A. accounts for the largest share of 15.3%, followed by U.S.S.R., Japan, U.K. and Federal Republic of Germany.

Table 2.1.15 Destination of Exports

(Per cent)

	1982/83	1984/85
U.S.A.	10.5	15.3
Japan	9.5	9.2
United Kingdom	4.8	5.8
Federal Republic of Germany	3.9	4.1
Other OECD and EEC countries	11.7	11.9
U.S.S.R.	19.0	14.3
Other East Europe	4.0	2.9
Developing countries (Non-OPEC)	12.1	12.9
OPEC	9.3	8.1
Others	15.2	15.5
Total	100.0	100.0
(Billion rupees)	(88)	(116)

Source: Ministry of Finance, Economic Division

(6) Finance

Finance of India is divided into three units of public sector, namely, Central Government, State Governments and Union Territories.

Outlay is classified into "Development or Plan" and "Non-Development or Non-Plan." Development finance includes 11 items of Agriculture, Farm development, Special regional development, Irrigation and flood prevention, Energy, Mining and manufacturing, Transportation, Communication, information and broadcasting, Science and technology, Social welfare and others. Non-Development includes National defence, Interest payment, Subsidies and Grants to foreign governments. Central Government's grants-in-aid to state governments and union territories belong to Non-Development.

Sources of revenue and receipts are Taxe revenue, Non-tax revenue from public enterprises such as railways, postal and telegraph services (operated under direct control of Central government) and power, road transport, forestry and mining (operated under direct control of state governments), Contribution from Central government operated enterprises, borrowings from markets, small saving deposits, state provident funds, long-term loans from financial institutions and external assistances. Taxes consist of direct taxes and indirect taxes. The direct taxes include corporation tax, income tax, tax on interest, etc. and the indirect taxes include customs duties, purchase tax, stamp duty and others.

In the balance, outlay tends to exceed revenue and it shows deficit year after year. Budgetary deficit showed decline up to 1983 fiscal year from Rs.35 billion, but it increased to Rs.59 billion in 1984 F.Y. as revised estimate.

The table below shows the financial condition at the first and last fiscal years of the Sixth Plan. During the period the budget of both outlay and revenue doubled. Though the composition ratio of Development and Non-Development in the outlay remained almost unchanged, the weight of tax revenue in the revenue decreased whereas that of Non-tax revenue and Domestic capital receipts increased. Net external assistance showed increase from Rs.17 billion to Rs.21 billion, but its weight in the revenue decreased from 5.1% to 3.1%.

Table 2.1.16 Budgetary Transactions of the Central and State Governments and Union Territories

(Billion rupees)

	1980/81	1984/85 (RE)	Magnification (1980=1)	Composition (%) 1980/81	Composition (%) 1984/85
Outlay:					
Developmental	244	480	2.0	66.3	65.6
Non-Develpmental	124	252	2.0	33.7	34.4
Total (A)	368	732	2.0	100.0	100.0
Revenue and Receipts:					
Tax revenue	198	360	1.8	59.2	53.5
Non-tax revenue	47	118	2.5	14.1	17.5
Domestic capital receipts	72	174	2.4	21.6	25.9
Net external assistance	17	21	1.2	5.1	3.1
Total (B)	334	673	2.0	100.0	100.0
Budgetary deficit (B)-(A)	35	59	1.7	-	-

Source: Economic Survey 1985-86

The number of Central government's public enterprises increased from 168 to 205 during the period, and their financial condition in the aggregate showed that capital employed doubled, turnover increased 1.9 times and gross profit before interest and tax increased 3.3 times.

Table 2.1.17 Profile of Central Government Public Enterprises

		1980/81	1984/85	Magnification (1980=1)
Number of running public enterprises		168	205	1.2
Capital employed	(Billion Rp.)	182	364	2.0
Turnover	(-do-)	286	547	1.9
Gross margin	(-do-)	24	74	3.1
Depreciation	(-do-)	10	28	2.8
Gross profit	(-do-)	14	46	3.3
Interest	(-do-)	14	25	1.8
Tax	(-do-)	2	12	6.0
Net profit	(-do-)	(-) 2	9	
Gross profit to Capital employed	(per cent)	7.8	12.7	-

Source: Economic Survey 1985-86

Net profit improved out of Rs.2 billion in the red into Rs.9 billion in the black. Also, the ratio of gross profit before interest and tax to capital employed rose from 7.8% to 12.7%.

Although the financial condition of Central government public enterprises in the aggregate improved as above, the sectors that contributed to such improvement were three, that is, steel, chemical and fertilizer, and petroleum. Steel sector reduced loss, chemical and fertilizer sector could cover loss and produced marginal income, and petroleum sector increased profit.

(7) Balance of international payments

Details of India's balance of payments is available only up to 1983 fiscal year.

Comparison of the payments balance between 1980 and 1983 fiscal years reveals that firstly trade balance showed

improvement; trade deficit decreased 1.7% because of 54.6% growth of exports thanks to increased crude oil export as against 27.9% growth of imports.

Receipts and payments of foreign currency in sightseeing, transportation, insurance and others exclusing capital transactions showed a decrease of 5.2% in the black. Of the payments, interest and service payments on foreign loans and credits showed 64.3% increase from Rs.2.8 billion to Rs.4.6 billion.

As a result, the deficit in current account increased 21.1% from Rs.22.2 billion to Rs.26.9 billion.

As regards capital transactions, private sector showed net receipts of Rs.1 billion in 1980 with total receipts of Rs.1.6 billion and total payments of Rs.0.6 billion, but in 1983, the net receipts increased to Rs.7.4 billion because total receipts and payments increased to Rs.8.9 billion and Rs.1.5 billion, respectively. In government sector, in 1980, the balance was net payments of Rs.1.9 billion with total receipts and payments being Rs.10.1 billion and Rs. 12 billion, but in 1983, it showed net receipts of Rs.2.6 billion as total receipts and payments increased to Rs.18 billion and Rs.15.4 billion, respectively. Capital transactions include also amortization payments on bilateral food assistance agreement with U.S.A.

In the aggregate, India's balance of payments deficit decreased by 8.3% from Rs.31.5 billion in 1980 to Rs.28.9 billion in 1983.

As against the above balance of payments deficit, India received external assistance of Rs.16.9 billion made up of Rs.11.8 billion of loans and Rs.5.1 billion of grants in 1980 and Rs.22.5 billion consisting of Rs.18.7 billion

of loans and Rs.3.8 billion of grants in 1983. Besides, it drew from IMF Rs.8.2 billion in 1980 and Rs.14.1 billion in 1983.

Total financing in foreign currency amounted to Rs.26.3 billion in 1980 and Rs.36.6 billion in 1983, and when balanced with the balance of payments deficit, foreign exchange reserves showed a decrease of Rs.5.2 billion in 1980 and an increase of Rs.7.7 billion in 1983.

Table 2.1.18 Balance of Payments (Adjusted)

(Billion rupees)

	1980/81	1983/84	% Change 1980-1983
Trade Balance	- 59.7	- 58.7	- 1.7
Imports-c.i.f.	125.4	160.4	27.9
Exports-f.o.b.	65.8	101.7	54.6
Invisibles	37.5	31.8	- 5.2
Receipts	53.3	64.3	20.6
Payments	15.8	32.5	105.7
(Of which interest and service payments on foreign loans and credits)	(2.8)	(4.6)	(64.3)
Current Account	- 22.2	- 26.9	21.1
Capital Transactions	- 7.7	3.0	
Private-net (receipts-payments)	1.0	7.4	
Government-net (-do-)	- 1.9	2.6	
Amortization payments-gross	- 6.9	- 8.1	
Repurchase of rupees from IMF	(0.08)	- 0.7	
Banking Capital-net	0.1	1.8	
Errors and Omissions	- 1.6	- 4.9	206.3
Total Deficit	- 31.5	- 28.9	- 8.3
External Assistance	16.9	22.5	33.1
Loans	11.8	18.7	58.5
Grants	5.1	3.8	- 25.5
Drawing from IMF-gross	8.2	14.1	72.0
Allocation of SDR	1.2	-	
Total Finance	26.3	36.6	39.2
Foreign Exchange Reserves	- 5.2	7.7	

Source: Economic Survey 1985-86

(8) External assistance

Inflow of external assistance during the Sixth Plan is as shown in the table below.

The amount of external assistance actually used was in the range of Rs.18.7 billion to Rs.23.5 billion during the period from 1980 to 1984. However, the ratio of debt servicing to the total assistance rose from 37% in 1980 to 50% in 1984, and the ratio of interest to the external servicing from 35% in 1980 to 45% in 1984.

As a result, net inflow of external assistance decreased from Rs.13.6 billion in 1980 to Rs.11.8 billion in 1984.

Table 2.1.19 Inflow of External Assistance: Gross and Net

(Billion rupees)

	1980/81	1981/82	1982/83	1983/84	1984/85
Authorizationss	38.5	28.4	29.5	20.8	46.9
Utilizations	21.6	18.7	22.5	22.7	23.5
Debt servicing	8.0	8.5	9.5	10.3	11.8
(Amortisation	5.2	5.4	5.9	6.1	6.5)
(Interest	2.8	3.1	3.6	4.2	5.3)
Net inflow of assistance	13.6	10.2	13.0	12.4	11.8

Source: Economic Survey 1985-86

In the table on the next page are shown the details of external assistance in 1980, 1983 and 1984.

The assistance consists of loans and grants, and the percentage of loans in the total increased and that of grants decreased.

The percentage of assistance from Consortium Members in the total assistance was 93% in 1980, 91% in 1983 and 88% in 1984. Of the members, U.K., Japan, Federal Republic of Germnay, France, Netherlands and U.S.A. are

Table 2.1.20 Utilizations of External Assistance Classified by Source

(Billion rupees)

Source and Type of Assistance	1980/81	1983/84	1984/85
I. Consortium Members:			
Loans	16.9	18.6	17.6
Grants	3.1	2.0	3.1
Total	20.0	20.6	20.7
Country-wise Distribution:			
U.K.	2.0	1.2	1.9
Japan	0.9	1.4	0.7
F.R.G.	1.4	1.2	1.3
France	0.7	0.5	1.0
Netherlands	1.1	0.7	0.7
U.S.A	0.8	0.8	0.5
Other seven countries	0.8	0.7	1.2
IBRD	1.4	4.9	3.4
IDA	5.2	9.0	9.8
EEC (Special Action Credit)	0.2	-	-
IFAD	0.1	0.2	0.2
IMF Trust Fund	5.4	-	-
II. U.S.S.R. and East European countries:			
Loans	0.3	0.7	1.1
III. Others:			
Loans	0.5	0.3	0.9
Grants	0.8	1.0	0.8
Total	1.3	1.3	1.7
Grand total	21.6	22.6	23.5
Loans	17.6	19.6	19.6
Grants	4.0	3.0	3.9

Source: Economic Survey 1985-86

major countries. Since 1981, U.K. extended only grants and the Netherlands provided more grants than loans, but Japan, Federal Republic of Germany and U.S.A. extended more loans than grants and France loans only.

Of the Consortium Members, the assistance from international financial institutions was loans only, and the World Bank group provided the largest assistance; IBRD, or International Bank for Reconstruction and Development or World Bank in short, providing Rs.3.4 billion and IDA, International Development Association, or Second World Bank, extending assistance amounting to Rs.9.8 billion. The total assistance from these organizations accounts for 64% of the total assistance from the Consortium Members and 56% of the total external assistance. IMF Trust Fund extended assistance only in 1980.

The assistance from U.S.S.R. and other East Europe since 1980 shows loans from U.S.S.R., which amounted to Rs.1.1 billion in 1984.

In addition, India received loans from Arab oil producing countries and grants under United Nations Emergency Operations.

Incidentally, the Consortium Members reviewed India's policies and requests for assistance for the Seventh Five Year Plan and made pledges to extend assistance of 4 billion SDR in 1985, the first year of the Plan, which is almost same as that in 1984. (June 1985 in Paris)

For reference, India's foreign exchange reserves changed as follows:

Table 2.1.21 India's Foreign Exchange Reserves

(Billion rupees)

End of March	Foreign Exchange	SDRs	Gold	Total
1983	42.7	(270.2 millions of SDRS x 10.754) 2.9	2.3	47.9
1984	55.0	(216.4 millions of SDRs x 11.394) 2.5	2.3	59.8
1985	68.2	(146.5 miilions of SDRs x 12.321) 1.8	2.5	72.5

Source: Economic Survey 1985-86

International Financial Statistics, IMF

2-1-2. Long-range Socio-Economic Development Plan and the Seventh Five Year Plan

(1) Long-range socio-economic development plan

India's long-range socio-economic plan has the objective that almost all of the people can satisfy basic necessity of living by 2000 and is based on the basic policy of ensuring employment and eliminating poverty.

Increase in population poses an important problem, and the population is expected to increase from 760 million in 1985 to a little less than one billion in 2000. Of the population, labour force in the age group of 15 and over is expected to increase from 288 million in 1985 to 480 million in 2000 and this makes expansion of labour-intensive projects an important subject.

Table 2.1.22 Population Projections 1981-2001

	1981-86	1986-91	1998-96	1996-2001
Population at the end of the period (as on 1st March) (Million)	761	837	913	986
Growth rate (Per cent)	2.10	1.90	1.74	1.53

Source: Seventh Five Year Plan 1985-90
Government of India, Planning Commission

Table 2.1.23 Projections of Labour Force and Employment

	1984/ 85	1989/ 90	1999/ 2000	Growth rate 1985-90	Growth rate 1999-2000
A. Labour force (million in the age group 15 & over)	288	327	408	2.6%	2.2%
B. Employment (million standard person years)	187	227	318	4.0	3.4
B/A (Per cent)	64.9	69.4	77.9	-	-

Source: Seventh Five Year Plan 1985-90

The plan also aims at decreasing percentage of people below poverty line in the total population from 37% in 1985 to 5% in 2000.

Table 2.1.24 Indicators in percentage of People below Poverty Line in Total Population, 1985-2000

1984/85	1989/90	1999/2000
37.0	26.0	5.0

Source: Seventh Five Year Plan 1985-90

To achieve the above subject and objectives, GDP (factor cost at 1984 prices) is planned to expand at a rate of 5% a year to 2000. This means that per capita GDP is to grow at a rate of 3% a year to 1990 and thereafter 3.2% a year to 2000.

Table 2.1.25 Projected Growth of GDP 1985-2000

		(Rupees at 1984/85 prices) 1984/85	1989/90	1999/2000
GDP at factor cost	(Billion Rs.)	1,934.3	2,468.8	4,021.4
	(Annual growth rate)	-	5.0	5.0
Per capita GDP	(Rupees)	2,616	3,027	4,163
	(Annual growth rate)	-	3.0	3.2

Source: Seventh Five Year Plan 1985-90

To achieve the long-range objective, it is necessary, in agriculture and regional development, to promote irrigation, expand farm land, increase production of food, and implement improvement of hygienic environment including supply of drinking water.

Major policies for industry field includes modernization of existing facilities, cost reduction, improvement of product quality and technical standards.

Emphasis in investment is placed on the development of infrastructures such as electric power, transportation and coal, and introduction and development of new technologies is mainly directed to electronics, information-communication, measurement, bio-technology and offshore development.

In the aspect of foreign trade, efforts are to be made to improve international competitiveness of products and increase exports and decrease imports by substitution with domestic products. The long-range objective also envisages that foreign assistance is permitted, but is limited so that debt servicing ratio does not exceed 20%.

The following table shows the frame of the long-range socio-economic development plan to 2000 (both GDP and consumption expenditure are expected to grow at a rate of 5% a year.)

Table 2.1.26 Macro Economic Aggregates

	(Billion rupees at 1984/85 prices) 1984/85	1989/90	1999/2000	Growth rate* 1985-90	1999-2000
I. GDP at factor cost	1,934.3	2,468.8	4,021.4	5.0	5.0
II. Indirect taxes less subsidies	243.3	350.6	659.4	7.6	6.5
III. GDP at market prices (I+II)	2,177.6	2,819.5	4,680.8	5.3	5.2
IV. Net factor income from abroad	(-) 6.8	(-) 5.0	(-) 1.0	(-)6.0	(-)14.9
V. Other current transfers	28.0	30.0	35.0	1.4	1.6
VI. Disposal income (III+IV+V)	2,198.8	2,844.5	4,714.8	5.3	5.2
VII. Gross domestic savings	507.4	690.0	1,205.4	6.3	5.7
VIII. Consumption expenditure	1,691.4	2,154.5	3,509.4	5.0	5.0
(Private:	1,463.1	1,852.9	3,018.1	4.8	5.0)
(Public:	228.3	301.6	491.3	5.7	5.0)
IX. Gross domestic capital formation	533.4	730.0	1,235.4	6.5	5.4
X. Foreign savings	26.0	40.0	30.0	9.0	(-)2.8
XI. Rate of domestic savings (VII/III)	23.3	24.5	25.8	-	-
XII. Rate of investment (IX/III)	24.5	25.9	26.4	-	-

*Annual compound growth rate
Source: Seventh Five Year Plan 1985-90

Table 2.1.27 Projected Sectoral Annual Growth Rates and Composition of Gross Value Added at Factor Cost 1984-85

(Per cent)

	Growth rate		Sectoral Composition		
	1985-90	1990-2000	1984/85	1989/90	1999/2000
Agriculture	2.5	2.4	36.9	32.7	25.5
Mining & manufacturing	6.8	6.9	18.1	19.8	23.6
(Mining	11.7	3.5	3.5	4.8	3.8)
(Manufacturing	5.5	7.8	14.6	15.0	19.8)
Electricity, gas and water supply	7.9	7.7	2.0	2.3	2.9
Construction	4.8	4.9	6.2	6.2	6.1
Transport	7.1	5.3	5.6	6.2	6.4
Services	6.1	5.8	31.2	32.9	35.5
Total	5.0	5.0	100.0	100.0	100.0

Source: Seventh Five Year Plan 1985-90

(2) Economic indicators under the Seventh Five Year Plan

Socio-economic development plan under the Seventh Five Year Plan (from April 1985 to March 1990) is drawn up within the frame of the long-range plan up to 2000. (See the preceding section.) The important indicator is that GDP and consumption expenditure grow at a annual rate of 5% at 1984 prices.

The following table shows the breakdown of the indicator and shows projected production of major minerals, manufactures and infrastructure under the Seventh Plan.

Of the minerals, relatively low growth rate of production is planned for crude oil, but high growth is planned for other items.

Relatively high growth is planned for almost all items of manufactures. Especially high is electronics and hydro-turbines.

Table 2.1.28 Output Projections: Minerals, Manufactures and Infrastructure Services

	Unit	1984/85	1989/90	Per cent*1
Coal	Million tonnes	147.4	226.0	8.9
Lignite	-d0-	7.8	15.2	14.9
Crude oil	-do-	29.0	34.5	3.6
Iron ore	-do-	42.2	58.1	6.6
Sugar	-do-	6.2	10.2	10.5
Petroleum products	-do-	33.2	45.5	6.5
Fertilizers(Nitrogenous)	-do-	3.9	6.6	10.9
Fertilizers(Phosphatic)	-do-	1.3	2.2	11.6
Cement	-do-	30.1	49.0	10.2
Steel(Main and mini steel plants)	-do-	8.8	12.6	7.6
Pig iron for sale	-do-	1.2	1.8	7.6
Aluminium	Thousand tonnes	276.5	499.0	12.5
Copper (refined)	-do-	33.5	42.7	5.0
Zinc	-do-	57.6	89.0	9.1
Lead	-do-	14.2	27.0	13.7
Machine tools	Billion rupees	3.0	5.0	10.5
Electronics	-do-	20.9	108.6	39.0
Tractors	Thousand units	85.0	135.0	9.7
Commercial vehicles	-do-	96.8	160.0	10.6
Transformers	Million kVA	24.5	32.0	5.5
Electric motors	Million H.P.	4.9	6.5	5.7
Hydro turbines	MW	200.0	1,400.0	47.6
Thermal turbines	-do-	2,900.0	3,700.0	5.0
Electricity generation	Billion kWh*2	167.0	295.4	12.1
Railways (Originating traffic)	Million tonnes*3	263.0	340.0	5.3
Ports (Traffic handled)	-do-	106.7	147.0	5.6

*1 Annual compound growth rate
*2 Including generation by non-utilities
*3 Including railway materials, etc.

Source: Seventh Five Year Plan 1985-90

Based on the above output projections and estimates of domestic demand for major products, their demand-supply balance in 1990 was estimated, which was used in forecasting their exports and imports as shown in the table below.

Iron ore is the major export item. As regards crude oil, domestic demand increases faster than production and it means its import will continue. Sugar will become self-sufficient. Fertilizers, both nitrogenous and phosphatic, will continue to be imported. Net import of more than one million tonnes of steel products will be necessary. In addition, all copper, zinc and lead is expected to be imported.

Table 2.1.29 Material Balances for Selected Commodities (Domestic demand - Production, considering change in Stocks)

	Unit	Exports		Imports	
		1984/85	1989/90	1984/85	1989/90
Iron ore	Million tonnes	24.50	28.90	-	-
Crude oil	-do-	6.48	-	13.64	13.51
Sugar	-do-	0.01	0.40	1.00	-
Fertilizer (Nitrogenous)	-do-	-	-	2.02	2.54-2.74
Fertilizer (Phosphatic)	-do-	-	-	0.75	0.81-1.01
Steel products	-do-	0.15	0.38	1.99	1.59
Aluminium	Thousand tonnes	-	-	56.0	N.A.
Copper (Refined)	-do-	-	-	76.1	98.7
Zinc	-do-	-	-	73.0	73.8
Lead	-do-	-	-	47.0	58.0

Source: Seventh Five Year Plan 1985-90

The amount of merchandise exports during the Seventh Plan is expected as follows. Namely, it is expected to expand at annual rate of 6.8% for the five years and the total amount for the period reach Rs.607 billion.

Items which will show increase of 6.8% or more include cashew kernel, iron ore, garments, engineering goods and chemicals and allied products.

The items which will account for 5% or more of the total exports in 1990 fiscal year amounting to Rs.138 billion include tea, garments, engineering goods, chemicals and allied products, gems and jewellery.

Table 2.1.30 Merchandise Exports: Seventh Plan (1985-90)

(FOB, Million rupees at 1984/85 prices)

Products/Product groups	1984/85	1989/90	Per cent*	1985-90 Total
1. Tea	7,180	7,700	1.4	37,240
2. Coffee	2,210	2,320	1.0	11,360
3. Tobacco unmanufactured	2,120	2,580	4.0	11,930
4. Cashew kernel	2,170	3,120	7.5	13.340
5. Processed food	3,280	4,240	5.3	19,180
6. Spices	2,170	2,700	4.5	12,430
7. Marine products	3,880	4,460	2.8	21,130
8. Jute manufactures	2,070	2,220	1.4	10,780
9. Iron ore	4,380	6,080	6.8	26,760
10. Leather and leather manufactures	5,330	5,770	1.6	27,960
11. Cotton textiles	3,800	4,400	3.0	20,770
12. Garments	8,750	13,360	8.8	56,830
13. Engineering goods	8,700	18,620	16.4	70,110
14. Chemicals and allied products	7,600	12,240	10.0	51,050
15. Gems and jewellery	13,670	16,630	4.0	77,000
16. Other handicrafts	4,150	4,940	3.5	23,070
17. Others	18,160	26,930	8.2	115,590
Total exports	99,620	138,310	6.8	606,530

*Annual compound growth rate

Source: Seventh Five Year Plan 1985-90

The amount of merchandise imports during the Seventh Plan period is forecasted as follows: Namely, it is expected to increase at annual rate of 5.8% during the five years and the total imports for the period reach Rs.954 billion. Items which will show increase of 5.8% or more include crude oil and petroleum products, chemi-

cal fertilizers and fertilizer raw materials, and coking coal. Those which show decrease are newsprint and edible oil, and it is expected that cement, synthetic and regenerated fibres become self-sufficient.

It is expected that of the total imports in 1990, Rs.207 billion, crude oil and petroleum products, and chemical fertilizers and fertilizer raw materials account for 25% and 15%, respectively.

Table 2.1.31 Merchandise Imports: Seventh Plan (1985-90)
(CIF, Million rupees at 1984/85 prices)

Products/Product groups	1984/85	1989/90	Per cent*	1985-90 Total
1. Crude oil and petroleum products	34,460	51,360	8.3	222,730
2. Chemical fertilizers and fertilizer raw materials	18,190	30,150	10.6	131,440
3. Finished, alloy and special steels	9,730	8,880	(-)1.8	43,400
4. Major non-ferrous metals	3,500	3,800	1.7	19,080
5. Cement	330	-	-	330
6. Newsprint	1,200	860	(-)6.4	4,730
7. Edible oils	12,000	9,090	(-)5.4	45,450
8. Coking coal	500	1,640	26.8	6,000
9. Synthetic and regenerated fibres	670	-	-	1,430
10. Others including contingency imports	75,420	101,160	6.0	479,780
Total imports	156,000	206,940	5.8	954,370

*Annual compound growth rate

Source: Seventh Five Year Plan 1985-90

Balance of payments during the Seventh Plan is projected as shown in the table below. Trade balance is expected to show a deficit of Rs.347 billion and current account a deficit of Rs.200 billion.

To cover the deficit, India will receive assistance and make borrowings from foreign countries. It is expected that efforts will be made to limit the ratio of debt servicing to current receipts to 17.6% and the ratio of current account deficit to GDP to 1.6%.

Table 2.1.32 Balance of Payments Projections: Seventh Plan 1985-90

(Billion rupees at 1984/85 prices)

1. Exports		607
2. Imports		954
3. Trade balance	(-)	347
4. Invisibles (net)		147
5. Current account deficit	(-)	200
Financing:		
1. Net aid and other borrowing		209
2. Use of foreign exchange reserves	(-)	2
3. Loss from decline in the import purchasing power of exports	(-)	7
Financing total		200
Memo items:		
1. Debt service relative to current receipts		17.6%
2. Current account deficit relative to GDP		1.6%

Source: Seventh Plan 1985-90

(3) Finance in the Seventh Five Year Plan (Public Sector)

To accomplish the economic goals of the Seventh Plan, the receipts and expenditures of the public sector (incl. Central Government and its Union Territories and State Governments) are planned as shown in the following table.

The total expenditures amount to Rs.4,648 billion, of which Rs.2,848 billion is for Non-Development and the remaining Rs.1,800 billion is for Development. Central Government's and its Union Territories' expenditures are Rs.2,497 billion and State Governments' expenditures are Rs.2,151 billion.

Of the expenditures for Development, the budget related to energy has the largest share, followed by industry & minerals, transport, and irrigation & flood control.

As against the above expenditures, the receipts total Rs.4,508 billion, consisting of Rs.2,795 billion from taxe and non-tax revenues and Rs.1,713 billion from contribution of public enterprises, market borrowings (net), small savings, state provident funds, misc. capital receipts (net), long-term loans from financial institutions, additional resource mobilization and net capital inflow from abroad. Financial deficit is expected to be Rs.140 billion.

The financial deficit of Rs.140 billion includes taxes uncollected of about Rs.53 billion carried over from the 1984 fiscal year, and so, the net financial deficit in the Seventh Plan period is expected to be Rs.87 billion.

This net financial deficit of Rs.87 billion represents the difference between Rs.1,800 billion for Development and Rs.1,713 billion including contribution of public enterprises through net capital inflow from abroad.

In the following table is given a comparison between the outlay related to industry and minerals by Ministry/ Department of the Central Government during the Seventh Plan period and the similar expenditures in the Sixth Plan period.

The total outlay budgets of 20 Ministries and Departments during the Seventh Plan period is Rs.172,681 million, a 28.1% increase overthe expenditure of Rs.134,786 million during the Sixth Plan period.

Of the total outlay during the Seventh Plan period, the budget for Department of Steel accounts for 37.2%, an increase of 33.5% over the expenditure in the preceding plan, and Department of Mines 11.9% (an 12.6% increase), Department of Fertilizers 11.7%, Department of Public Enterprises 9.6% and Department of Atomic Energy 6.2%.

Department of Steel and Department of Mines belong to Ministry of Steel and Mines, and the budgets of those two Department accounts for 49% of the total.

The breakdown of the budgets of Department of Steel and Department of Mines under the Seventh Plan is given in separate tables in the following pages.

Of ithe budget of Department of Steel totalling Rs.64.2 billion, the total outlay for SAIL's Bhilai, Bokaro, Durgapur (incl. Alloy Steel Plant), Rourkela and Salem steel plants and IISCO, R & D Centre, Central Marketing Organization under SAIL as well as its Corporate Office and Management Training Institute is Rs.35.2 billion and accounts for 55% of the total outlay of Department of Steel. For Vizag Steel project, the outlay of Rs.25 billion is appropriated.

Table 2.1.33 Public Sector - Sources and Application of Funds: Seventh Plan (1985-90)

(Billion rupees at 1984/85 prices)

Receipts	Centre & Union Territories	States	Total
(A) Revenue Receipts			
1. Tax revenue (Gross)	1,389	794	2,183
2. States' share of central taxes	(-) 361	361	-
3. Non-tax revenue	355	204	560
4. Grants from the Centre	-	52	52
(Sub-total)	(1,384)	(1,411)	(2,795)
(B) Other Receipts			
1. Contribution of public enterprises	375	(-) 20	355
(a) Centre (i) Railways	42	-	42
(ii) Posts & Telegraphs	17	-	17
(iii) Other enterprises	315	-	315
(b) States (i) State electricity boards	-	(-) 16	(-) 16
(ii) State road transport corp.'s	-	(-) 4	(-) 4
(iii) Others	-	(0.2)	(0.2)
2. Market borrowings (Net)	206	99	306
3. Share in small savings	64	115	179
4. State provident funds	23	50	73
5. Miscellaneous capital receipts (Net)	198	(-) 72	126
6. Negotiated loans	-	46	46
7. Additional resource mobilization	225	222	447
8. Net capital inflow from abroad	180	-	180
(Sub-total)	(1,271)	(442)	(1,713)
Total Receipts (A + B)	2,654	1,853	4,508
(C) Central assistance to state plans	(-) 297	297	-
(D) Deficit financing	140	-	140
Grand Total (A+B+C+D)	2,497	2,151	4,648

Expenditures	Centre & Union Territories	States	Total
(A) Non-Development			
1. Interest payments	462	204	666
2. Maintenance expenditure on the Sixth Plan schemes	17	80	97
3. Subsidies	168	-	168
4. Defence	450	-	450
5. Other non-development expenditure	339	1,060	1,399
6. Grants to States, Union Territories and local bodies	61	-	61
7. Grants to foreign governments	7	-	7
(Sub-total)	(1,504)	(1,344)	(2,848)
(B) Development			
1. Agriculture	43	62	106
2. Rural development	49	41	91
3. Special area programmes	-	31	31
4. Irrigation & flood control	10	160	170
5. Energy	320	228	548
6. Industry & minerals	187	38	225
7. Transport	172	58	230
8. Communication, information and broadcasting	64	1	65
9. Science & Technology	23	2	25
10. Social services	122	172	294
11. Others	3	14	17
(Sub-total)	(993)	(807)	(1,800)
Grand Total (A+B)	2,497	2,151	4,648

Note: Rupees of each item is rounded off to billion.

Source: Seventh Five Year Plan 1985-90

Table 2.1.34 Ministry/Department-wise Outlay
Seventh Plan (1985-90)

(Million rupees)

Ministry/Department	Sixth Plan Expenditure	Seventh Plan Outlay
I. Department of Steel	48,075	64,201
II. Department of Mines	18,213	20,500
III. Ministry of Petroleum & Natural Gas	4,918	3,077
IV. Department of Fertilizers	20,451	20,258
V. Department of Agriculture and Cooperation	5,940	6,350
VI. Department of Chemicals & Petrochemicals	*1	7,066
VII. Department of Public Enterprises	17,658	16,548
VIII. Department of Industrial Development		3,352
IX. Department of Surface Transport (Shipbuildings)	810	1,300
X. Department of Electronics	1,738	4,710
XI. Department of Atomic Energy	4,810	10,750
XII. Department of Revenue	6	20
XIII. Department of Economic Affairs (Mints & Presses)	807	2,750
XIV. Department of Economic Affairs (Banking Division)	8,384	8,500
XV. Ministry of Civil Supplies	85	300
XVI. Ministry of Commerce	1,553	800
XVII. Ministry of Textiles	1,289	1,800
XVIII. Department of Science and Industrial Research	49	150
XIX. Department of Supply	*2	150
XX. Department of Ocean Development		100
Total	134,786	172,681

*1 Sixth Plan provisions included under Ministry of Petroleum and Department of Fertilizers
*2 Provision shown in the Science and Technology Sector

Source: Seventh Five Year Plan 1985-90