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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

INDIA - IFFCO FERTILIZER PROJECT

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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

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AID-DLC/P-851/2

May 28, 1971

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: India - IFFCO Fertilizer Project

Attached for your review are the recommendations for an amended loan authorization increasing by \$6,000,000 a loan in an amount of \$15,000,000 made to the Indian Farmers Fertilizer Cooperative Ltd. (IFFCO), a cooperative organized under the laws of India, for the purpose of building fertilizer manufacturing facilities in India.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Friday, June 4, 1971.

Rachel R. Agee
Secretary
Development Loan Committee

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES A-I

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CAPITAL ASSISTANCE PAPER

INDIA: Indian Farmers Fertilizer Cooperative Ltd.
Summary and Recommendations

1. Borrower. Indian Farmers Fertilizer Cooperative, Ltd., (IFFCO) a cooperative organized under the laws of India. The Government of India (GOI) will guarantee the loan.
2. Amount of Loan. \$6,000,000, to be added to \$15,000,000 previously authorized.
3. Project. The construction of fertilizer facilities capable of producing successfully fertilizers comprising 229,000 MT of nitrogen, 122,000 MT of phosphate and 62,000 MT of potash (nutrient tons).
4. Purpose. The project will increase domestic production of fertilizer which is one of the critical ingredients required to increase yield per acre and thereby narrow and eventually eliminate the gap between consumption and production of foodgrains in India.
5. Issues. There are no issues in this project.
6. Proposed Loan Terms.
 - (a) IFFCO will repay the loan in rupees to the GOI over a period of 15 years from the date of first disbursement, including a grace period of 4½ years, with interest at 8.5 percent per annum.
 - (b) The GOI will repay the loan to A.I.D. in dollars over a period of 40 years from the date of first disbursement, including a grace period of 10 years, with interest at the rate of 2 percent per annum during the grace period and 3 percent a year thereafter.
7. Other Lenders. The United Kingdom Overseas Development Agency (ODA) has authorized a loan of £ 7,000,000. The Industrial Development Bank of India (IDBI), a public sector intermediate credit institution, will authorize a local currency loan equivalent to \$49,640,000.
8. Ex-Im Bank Clearance. Received on March 7, 1968.
9. Statutory Requirements. All applicable criteria are met. The Statutory Checklist is attached as Annex I.
10. Mission Views and Certification. The Mission supports the project and recommends approval of the loan. The Acting Mission Director's Certification pursuant to Section 611 (e) of the Foreign Assistance Act of 1961, as amended, is attached as Annex H.

11. Recommendation. That the proposed loan be approved on the terms set forth in the draft Loan Authorization attached as Annex G.

Project Committee - USAID, New Delhi

Loan Officer	Robert N. Bakley
Counsel	Stephen W. Stein
Engineer	David C. Woody
Economist	Robert Rucker

May 28, 1971

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I. Introduction

1.1 On July 3, 1969, AID authorized a loan of \$15,000,000 to Indian Farmers Fertilizer Corporation Ltd. for the purpose of building fertilizer manufacturing facilities in India. The total foreign exchange cost of the project was, at that time, projected to be \$48,000,000. The balance of \$33,000,000 was expected to come from private U.S. financial institutions, of which \$29,700,000 was to be covered by an A.I.D. Extended Risk Guarantee. The A.I.D. loan funds were to be used for general procurement from the United States for all phases of the project.

1.2 Subsequently, a major change in the financing plan occurred. The Government of India secured United Kingdom Development Loan Funds to replace the loans from private U.S. financial institutions. Under the revised plan, A.I.D. loan proceeds will be used to finance all the dollar costs of the project, primarily the cost of the ammonia plant, while the U.K. credit will finance all the sterling costs of the project, the cost of the urea and most of the cost of the complex plant as well as off-site facilities. Under the new financial plan, the dollar costs are projected to be \$21,000,000 thereby necessitating an increase in the AID loan, now the only source of dollars for this project, by \$6,000,000.

1.3 Use of the U.K. credit in lieu of loans from U.S. financial institutions gives the GOI the advantage of a loan on considerably better terms. Private U.S. commercial funds at the time the projections were being formulated would have cost approximately 11 percent when all charges were included. The U.K. credit, available on concessional terms to the GOI, will carry no interest. Moreover the U.K. funds, which are part of a multi-year authorization, did not have competing claims for their use and were therefore not expected to be utilized in the immediate future.

1.4 This project is unique in at least two respects: it is the first time that the aid agencies of two government have collaborated on a single development project in India and, as explained in the original Capital Assistance Paper, it is a bridge in a long-range institution building project between farmer's cooperatives in the United States and India.

1.5 A casualty of the change in the source of foreign exchange financing has been the project schedule. The project is now expected to be completed a full year later than planned two years ago. And, as a result of this delay, total project costs have increased by approximately \$11,000,000, primarily due to inflation in the U.S., the U.K. and India. However, the foreign exchange costs have decreased due to India's increased capability to manufacture capital equipment used in fertilizer plants.

1.6 This Capital Assistance Paper is essentially an updating of the original CAP (AID-DLC/P-851) which included information on the project and the studies that have preceded it. Not all of that information is repeated here.

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II. Brief Project Description

2.1 The borrower, Indian Farmers Fertilizer Cooperative Ltd. (IFFCO), has entered into an agreement with Cooperative Fertilizers International (CFI), a non-profit organization owned by 13 American cooperative organizations, the largest of which is Central Farmers Industries, a major producer of fertilizer in the U.S. CFI will contribute one million dollars to the project and will have technical responsibility for the construction and initial operation of the plants.

2.2 IFFCO will construct an ammonia plant and a urea plant at Kalol, Gujarat and a complex plant--nitrogen, phosphate and potash (NPK)--at Kandla, Gujarat. The major feedstock for the ammonia plant will be natural gas located in fields adjacent to the Kalol site. Part of the ammonia will be used to make urea at Kalol and part will be shipped to Kandla and combined with imported phosphoric acid to make complex fertilizers.

2.3 The major contractors have been selected and contracts have been negotiated. Construction is expected to begin in July 1971.

2.4 IFFCO will sell its fertilizer to its cooperative owners in a 10-state area. A "seeding" program has commenced, under which imported fertilizer is distributed by IFFCO's marketing organization.

2.5 The total project cost is projected at \$122,133,000 of which \$37,373,000 is in foreign exchange and \$84,760,000 is local currency. The funds will be provided from two foreign exchange loans, one local currency loan and the owners equity.

III. Borrower

3.1 The borrower is Indian Farmers Fertilizer Cooperative Ltd. (IFFCO), a cooperative organized under the laws of India, which has its registered office at New Delhi, India.

3.2 At present, IFFCO is owned two-thirds by the Government of India (GOI) and one-third by approximately 28,000 Indian cooperative societies (Cooperatives). As of March 31, 1971, all the equity had been subscribed and about 25 per cent had been paid in. Ultimately, the GOI's ownership interest will be purchased by the Cooperatives and they will become the sole owners.^{1/} The constitution of the Board of Directors and the voting rights of the shareholders, however, are such that control now actually rests with the minority shareholders, the cooperatives, and the GOI's role is primarily that of an advisor.

3.3 The cooperative equity is distributed in IFFCO's ten state marketing area as follows:

TABLE I

<u>State</u>	<u>Amount Subscribed (RS.)</u>
Andhra Pradesh	957,000
Gujarat	10,484,000
Haryana	6,266,000
Madhya Pradesh	5,806,000
Maharashtra	3,768,000
Mysore	6,492,000
Punjab	22,563,000
Rajasthan	5,794,000
Tamil Nadu	5,110,000
Uttar Pradesh	22,760,000
	<hr/>
	90,000,000

3.4 IFFCO is presently guided by a 12 man Board of Directors, all of whom have been appointed by the GOI. The 12 man Board consists of seven from the cooperative sector, one of whom is chairman, three GOI officials, one private industrialist, and IFFCO's Managing Director. After March 31, 1973, the Board will consist of: (1) twelve nominees from State Apex Marketing Societies and National Cooperative Societies; (2) five members elected from the general body; (3) five persons nominated by the Government of India; and (4) IFFCO's Managing Director - a total of twenty-three. In terms of shareholder votes, the GOI will have 1,800 (one for each

^{1/} The precise method by which the GOI's ownership will be purchased has not yet been decided. One method, and the most likely, is for IFFCO to redeem the stock, using its earnings, thus creating Treasury Stock. The Treasury Stock could then be distributed to existing shareholders in proportion to their ownership as a dividend.

Rs. 100,000 of equity) while each cooperative shareholder will have one vote or, as now constituted, 28,000 votes.

3.5 IFFCO's senior management consists of its Managing Director, its Financial Advisor, and its Administrative Officer with the requisite supporting staff. All the necessary staff is in place and selection of personnel to fill all positions is proceeding.

3.6 The American Cooperatives, the founding fathers of the project, have formed Cooperative Fertilizers International (CFI) to provide advice and assistance to IFFCO through its formative years and initial operating years. CFI is owned by 13 major U.S. cooperative organizations who together have contributed one million dollars to IFFCO. CFI has a 12-man Board of Directors and is staffed by a full-time President, resident in Chicago, and, at present, an eight-men staff resident in India which is headed by an Operations Manager. Additional field personnel will be added as the need arises (provision has been made for a maximum of 39). CFI will also arrange for the training of IFFCO's operating personnel in U.S. cooperative plants which are similar to IFFCO's.

3.7 Based on a Cooperation Agreement entered into between IFFCO and CFI, CFI will have primary responsibility for the technical aspects of the project (planning, construction, and operation of the plants), while IFFCO's management will have primary responsibility for corporate management (financial planning, raising of equity, government relations, contract negotiations and marketing).

IV. TECHNICAL DISCUSSION

The Project

The Contractors

The Plants

Raw Materials, Utilities and Offsites

Capital Cost Estimates

Environmental Considerations in Plant Design and Operations

The Project

4.1 The project is the construction of a 910 metric ton per day (MT/D) (1,000 short tons per day) ammonia plant, a 1,200 MT/D urea plant and a complex plant capable of making 1,820 MT/D of diammonium phosphate (DAP) or various formulations of nitrogen, phosphate and potash (NPK). In nutrient terms these figures represent annual capacities of marketable fertilizers, after allowance for losses, of 229,000 MT of nitrogen and 122,000 MT of phosphate. About 62,000 MT of potash will be blended with nitrogen and phosphate to produce NPK formulations (probably 92,800 MT of 10-26-26, 92,800 MT of 12-32-16 and 189,900 MT of 14-36-12).

4.2 The ammonia and urea plants will be located at Kalol, Gujarat (near Ahmedabad) to take advantage of an adjoining gas field. The complex plant will be located at the port of Kandla in Western Gujarat to take advantage of imported phosphoric acid. Two hundred MT/D of ammonia will be transported by rail tank wagons from Kalol to Kandla (a distance of 250 miles) and the balance will be used at Kalol to manufacture urea.

4.3 While the dual site location has added to the capital cost of the project it has taken advantage of the natural location (or shortest receiving point) of its raw materials. Alternatively, the plant could have been constructed at one site. Had the Kalol site been used, both liquid phosphoric acid and solid potash would have had to be shipped from the closest port to the site which would be more costly than shipping ammonia from Kalol to Kandla. Had Kandla been the sole site, natural gas would have had to be transported to Kandla, or an alternative feed stock found. The combination selected is the most economic.

4.4 The dual site location will also give IFFCO flexibility for future expansion. Depending on the economics at the time it can (1) increase the size of the urea plant to utilize all ammonia produced at Kalol and use imported ammonia at Kandla or (2) erect phosphoric acid facilities at Kalol when the Udaipur phosphate rock deposits are commercially exploited.

The Contractors

4.5 Contracts for the three main plants have been negotiated, approved by IFFCO's Board of Directors, and are expected to be executed by June 30, 1971. In advance of the executed contracts, each contractor has entered into a preliminary agreement with IFFCO to investigate the availability, quality and delivery schedule of indigenous equipment. With the information developed from this investigation IFFCO will be able to obtain import licenses for the items that will be imported; and the prime contracts will be more precise in this contentious area. These preliminary agreements will be merged into the primary contracts.

4.6 The M.W. Kellogg Co., of Houston, Texas will design, supply and erect the ammonia plant which will be a duplicate of a U.S. cooperative ammonia plant located at Donaldsonville, Louisiana and similar to some 30 other Kellogg plants world-wide. The Donaldsonville plant has been an outstanding success, having been brought to full production capacity within 17 days of start-up and has produced at better than 100 percent of capacity since. Engineers (India) Ltd., a reputable Indian consulting firm, will be associated with Kellogg through a sub-contract.

4.7 The Kellogg contract is a lump-sum fixed price for foreign exchange costs with the exception of ocean freight, U.S. equipment suppliers' erection engineers, Kellogg expatriate personnel in India, and spare parts. These costs, as well as all local currency costs, are reimbursable. The Kellogg contract includes guarantees on plant performance, product quality and completion.

4.8 Humphreys and Glasgow, Ltd., of London, England will design, supply and erect the urea plant which will be based on a process developed by Stamicarbon of Geleen, Netherlands. H&G is an experienced, reputable firm and has the advantage of having a subsidiary company operating in India. The Stamicarbon process, known as the stripping process, is in use in eight plants world-wide and several others are under construction.

4.9 The H&G contract is a lump-sum fixed price for foreign exchange costs with the exception of ocean freight, U.K. equipment suppliers' erection engineers, and spare parts which are reimbursable. The U.K. equipment portion of the fixed price, however, is subject to an escalation formula using price indices as a basis. All local currency costs are reimbursable. The H&G contract includes guarantees on plant performance, product quality and completion.

4.10 Dorr-Oliver of Stamford, Connecticut will design, supply and erect the complex plant. The work will be performed primarily by two of Dorr-Oliver's wholly owned subsidiaries located at Croydon, England and Bombay, India. The firm and its subsidiaries have had years of experience in the complex fertilizer field. The plant will be similar, or a near duplicate, of one Dorr-Oliver has just completed for Madras Fertilizers Ltd., an affiliate of Standard Oil of Indiana.

4.11 The Dorr-Oliver contract is a fixed price lump-sum for foreign exchange costs with the exception of ocean freight which is reimbursable. Indigenous equipment and services are lump-sum subject to an escalation formula based on a number of Indian economic indices. All other local currency costs are reimbursable. The Dorr-Oliver contract includes guarantees on plant performance, product quality and completion.

The Plants

4.12 The ammonia plant will be the Kellogg catalytic high pressure reforming process using natural gas raw material and employing steam turbine driven centrifugal compressors. The plant is designed for total energy recovery, thus making outside supplied power unnecessary for any critical service while at the same time reducing overall production costs.

4.13 The plant equipment can conveniently be grouped into sections as follows:

- a. Raw Synthesis Gas Preparation - Raw synthesis gas, a mixture of hydrogen, nitrogen and carbon dioxide, is produced from combining natural gas with superheated steam and air. The natural gas is desulfurized, mixed with superheated steam and flows to the primary reforming furnace. In this furnace the steam and gas react at a very high temperature to form hydrogen and carbon monoxide. This mixture is further mixed with heated compressed air and flows to the secondary reformer where carbon monoxide burns with oxygen from the air. From this reaction the stoichiometric mixture of hydrogen and nitrogen required to make ammonia is obtained, plus large quantities of carbon dioxide. Traces of carbon monoxide are converted to carbon dioxide in a two stage shift converter. Large amounts of steam are generated from waste heat in this section of the plant for use in later stages.
- b. Synthesis Gas Purification is done before proceeding to the ammonia synthesis reaction. Removal of the carbon dioxide is accomplished in an absorber by use of an aqueous solution of MEA (mono ethanol amine). Final traces of carbon oxides are reduced to the required level by the methanator, in which they are converted into methane, an inert gas in the ammonia reaction. An important part of the gas purification system is the stripper in which the MEA solution is regenerated by steam stripping out the carbon dioxide. The carbon dioxide gas flowing out of the top of the stripper is cooled to condense excess moisture and then piped to the adjoining Urea Plant where it is one of the major raw materials, along with ammonia, in the manufacture of urea.
- c. Compression of the purified synthesis gas containing hydrogen and nitrogen at a volume ratio of 3:1 and a small amount of inert gas is accomplished by a high speed, turbine driven, two case centrifugal compressor. Recycle gas from the synthesis section is admitted at an interstage wheel for recompression to reaction pressure. The combined gas stream from the last compressor stage is cooled in several steps by water and ammonia refrigeration to -10° F and sent to the ammonia separator, a vessel where ammonia in the recycle gas is removed as a condensed liquid. The stream is further refrigerated to freeze out all traces of water and carbon dioxide and is then reheated for feeding to the ammonia converter.

4.14 Ammonia synthesis is accomplished by reacting the mixture of hydrogen and nitrogen, now compressed and purified, in the converter. The converter is a high pressure vessel containing iron oxide catalyst. The reaction proceeds progressively as the gas passes through the beds and exits with a weight concentration of 18 percent ammonia (12 percent by volume). It is cooled in several stages and then recompressed in

the final compressor stages along with the fresh synthesis gas. The ammonia is removed from this total stream by cooling and refrigerating then separating the condensed liquid in the ammonia separator. A purge gas stream which contains argon and methane is taken to the primary reformer for burning as fuel to prevent accumulation of these gasses which are inert to the reaction and would otherwise build up in the system. The liquid ammonia from the separator is flashed to a lower pressure and enters the refrigeration system where it is used to condense liquid ammonia from the compressor and purge gas streams. A second stage refrigerant stream at a lower pressure and temperature is replenished with liquid ammonia from the first stage and is used to further cool the compressor and purge gas streams. Following another flash to a lower pressure to remove the remaining inert gases, product ammonia is pumped from this third stage stream to the battery limits at - 28 degrees F and 60 psig.

4.15 Features of the compression and synthesis section are the high speed centrifugal compressors used for raising the synthesis gas to reaction pressure and for compressing ammonia gas to refrigerant condensing pressure. These machines form the true nucleus of the ammonia plant and the optimization of energy balance around them is a great contributor to the overall economy of the entire plant.

4.16 The Urea Plant will be the Stamicarbon total recycle carbon dioxide stripping process. Features of the plant will be steam driven compressors and the near elimination of carbamate recycle which is the result of the stripping process design.

4.17 Operation of the plant is as follows: In the Reaction Section, carbon dioxide directly from the Ammonia Plant is mixed with a small amount of air (which acts as a corrosion inhibitor) and compressed to 2100 psig. The compressor is in two stages, the lower stage being centrifugal and the high pressure stage being reciprocating. The pressurized carbon dioxide flows to the high pressure heat exchanger (the stripper) where it countercurrently contacts the liquid effluent from the autoclave (reactor), stripping out the excess ammonia from this stream which thereby becomes a dilute urea product stream and passes on to the recovery section. The gaseous carbon dioxide stream goes off the top of this exchanger mixed with the unreacted ammonia. This mixture enters the top of the high pressure carbamate condenser where it is mixed with an excess of ammonia and condensed to liquid carbamate. The carbamate along with uncondensed carbon dioxide, ammonia and steam pass on by gravity flow to the bottom of the autoclave where they mix with the fresh ammonia entering the autoclave. The total ammonia and carbon dioxide flows are carefully controlled to the stoichiometric ratio. The main reaction from carbamate to urea and water takes place in the autoclave. The mass flows upward during reaction and product flows down a central overflow pipe into the top of the high pressure exchange by gravity. Inert gas leaves the top of the autoclave and enters a scrubber where traces of ammonia and carbon dioxide are removed by a washing stream of carbamate. Scrubber

inert gasses are then depressurized and escape to the atmosphere.

4.18 The outstanding feature of the reaction section is the stripper which removes the unreacted carbamate for recycling without the need for a carbamate recycle pump, the bane of all previous urea plant designs. Carbamate is extremely corrosive and this method of recycling without need for rotating equipment is the most significant advance in recent urea plant designs. Other features are the carbamate condenser which isolates a highly exothermic reaction in a heat exchanger where the heat developed is recovered as steam. All parts contacting the carbamate and urea solutions are made of stainless steel to minimize corrosion and retain product purity.

4.19 In the Recovery Section, urea solution from the high pressure exchanger (stripper) is depressurized through a valve and enters the top of a rectifying column. The liquid flashes partially to a vapor at the lower pressure. In the rectifying column, a mixture of gases, ammonia, carbon dioxide and water vapor, strip remaining gases from the solution while a recirculation heater at the bottom of the column converts remaining small amounts of carbamate to gases. Product urea flows from the column to a storage tank. Gases from the top of the column are condensed to form low pressure carbamate which is pumped to a high pressure to combine with the stream of high pressure carbamate.

4.20 In the Evaporation Section, urea solution from the storage tank is pumped to the first stage of the two stage vacuum evaporators. Vacuum is maintained on both stages by steam jet rejectors. The overhead vapors, containing some ammonia are condensed and the ammonia is stripped out and returned to the recovery section. The urea, containing approximately 0.2 percent moisture, is pumped to the top of the prill tower.

4.21 In the Prilling Tower, urea prills are formed by dividing the molten urea into small droplets in the spray bucket and having these droplets solidify while falling against a countercurrent stream of air to the bottom of the tower. The prills are collected at the base of the tower by a scraper, loaded on to a conveyor for transfer to the urea storage building. The product will be guaranteed to be 95 percent between 1 mm and 2.5 mm, maximum 0.5 percent moisture and with a maximum buiret content of 0.9 percent.

4.22 The Complex Plant will be a Dorr-Oliver double stream plant using a combination of blungers and granulators. The plant will convert the raw materials, liquid ammonia, liquid phosphoric acid, solid potash, solid urea and filler into a range of solid products, all of which will be in the form of uniform granuler with low moistural content. The liquid ammonia, on arrival from Kalol by tank wagon, will be stored in a spherical tank and pumped from this tank to the process as required. Phosphoric acid (54 percent P_2O_5) arrives at the jetty by special tanker and is pumped

directly into the plant storage tank. Solid materials are unloaded from trucks into a hopper and conveyed to storage. The urea originates at the Kalol plant and is shipped to Kandla by truck or rail wagon. The potash, arriving by bulk sea freighter is unloaded at the dock and trucked to the plant.

4.23 The basic granulating medium is a slurry of ammonium phosphate which is prepared in the preneutralizer by ammoniating phosphoric acid to an ammonia to phos acid ratio of 0.5 to 1.45. The concentrated slurry is pumped to the granulator or blungers and ammoniated further. At the same time, the slurry is mixed with recycled finer, pulverized urea, potash and filler. A slightly moist fertilizer mixture is discharged to the dryer where it is reduced to specified dryness.

4.24 The flow is screened at the outlet of the dryer to separate out oversize and fines. The oversize granular are pulverized, mixed with fines and returned to the granulator or blungers.

4.25 The liquid raw materials, i.e., phosphoric acid and ammonia, are metered to the process by automatic flow control devices. The dry raw materials are fed from storage bins in the central bay by means of gravimetric belt feeders and positive flow bin bottoms.

4.26 The Product NPK can be varied over a wide range of formulae but the plant is specifically guaranteed to produce the following quantities of specific complexes. The capacities are for each train.

Grade	Capacity MT/hr.
10-26-26	50
12-32-16	40
14-36-12	35
18-46-0 (DAP)	30

The product will be 100 percent under 4 mm, at least 70 percent over 1.5 mm and at least 99 percent over 0.83 mm in size. Maximum moisture will be 1.0 percent for all grades except DAP which will be maximum 1.5 percent.

Raw Materials, Utilities and Offsites

4.27 The basic raw materials that will be used by IFFCO are natural gas, phosphoric acid and potash; lesser amounts of naphtha and fuel oil; and small amounts of chemicals, coating agents and filler.

4.28 The natural gas will come from adjacent wells owned by the Oil and Natural Gas Commission (ONGC), a public sector company. IFFCO has entered into a 12 year contract with ONGC to purchase 750,000 standard cubic meters (SM³) per day of natural gas, of which not less than 500,000 SM³ shall be free gas and the remainder associated gas. The effective date of the contract is August 1973. The price which IFFCO will pay for the gas is firm for the 12 year period.

4.29 IFFCO's phosphoric acid requirements are 129,400 MT a year. 85,000 MT will come from Shahpur, Iran - the maximum that Shahpur has for free sale - and the remaining 44,400 MT is expected to come from Mexico. The contract for the supply of phosphoric acid from Iran has been negotiated and is being reviewed by the GOI. Preliminary discussions have been held with a Mexican firm for the supply of the remaining acid, but serious negotiations have not yet commenced. We know of no constraint that will hinder IFFCO eventually negotiating contracts for its full requirements.

4.30 Potash is not available in India and all of IFFCO's potash requirements will be imported through Indian Potash Ltd., a public sector company, and delivered at the Kandla Port. Potash is presently not in short supply nor do we expect it to be in the foreseeable future.

4.31 Indian Oil Company has agreed to supply naphtha and fuel to IFFCO from its nearby refinery at Baroda, Gujarat. Sufficient capacity is available from the refinery for Indian Oil to fulfill its commitment.

4.32 The minor raw materials are all available in India in sufficient quantity to satisfy IFFCO's requirements.

4.33 Utility requirements - power and water - at the two sites will be very small. Power required at Kalol is less than 7500 KVA and at Kandla less than 10,000 KVA. The Gujarat State Electricity Board, which currently has excess capacity, will supply 66 KV power at the battery limits of each plant. Water, amounting to 2500 gallons per minute at Kalol and 400 gallons per minute at Kandla, will be supplied from adjacent tubewells by the local water authorities. Sufficient tubewells have been sunk and metered to assure a sufficient quantity of water for a minimum of 15 years.

4.34 Land at both sites has been leased for a 99 year period. At Kalol site preparation will be minor (basic leveling and grading) and the work has been contracted by IFFCO to a local firm. The Kandla site, however, is located on tidal land and requires extensive land fill and piling before it will be suitable for construction. Tenders are now being evaluated by IFFCO for the land fill and

related work and a contract is expected to be executed in June 1971. Dorr-Oliver, the complex plant contractor, will do the necessary piling to support the plant and offsites.

4.35 The Kalol site is located 12 miles from the main Ahmedabad-Baroda broad gauge line and the Western Railway Company will construct an extension from the line to Kalol. IFFCO has agreed to bear the cost of the work and the line is expected to be in place in time to handle supplies and equipment during the construction period.

4.36 At Kandla the only major additional item will be the construction of an extension to an existing jetty near the site to receive phosphoric acid. The Kandla Port Trust, the administrators of the port, have agreed to construct this extension and are in the process of selecting a competent contractor. The Kandla Port Trust budget is sufficient to cover this expenditure.

4.37 A housing colony will be located at both sites. IFFCO has retained two architectural firms to design the colonies. IFFCO expects to let contracts for the actual construction work.

4.38 All other off-sites (e.g., bagging units, storage facilities, raw water system, etc.) will be designed, supplied and erected by H & G, at Kalol, and Dorr-Oliver, at Kandla.

Capital Costs

4.39 The capital costs of the project as estimated by IFFCO are as follows:

TABLE II
(in thousands of U. S. Dollars)

<u>Item</u>	<u>Foreign Exchange</u>	<u>Local Currency</u>	<u>Total</u>
Preliminary expenses,			
project administration,			
seeding program	1,987	7,947	9,934
Land and site preparation	-	1,427	1,427
Ammonia plant	16,853	8,720	25,573
Urea plant	8,987	6,280	15,267
Complex plant	2,360	5,813	8,173

(Table Continued)

Offsites	3,187	18,307	21,494
Work outside battery limits	466	11,667	12,133
Escalation	2,266	6,200	8,466
Contingency	1,267	6,173	7,440
Interest during construction	-	8,893	8,893
Initial working capital	-	<u>3,333</u>	<u>3,333</u>
Totals	<u>37,373</u>	<u>84,760</u>	<u>122,133</u>

4.40 In general, the capital costs estimates are the most accurate and complete that we have reviewed. This is because (1) the project is about to commence the construction phase and most of the contracts have been negotiated and (2) India now has more experience with large scale fertilizer projects and costs, especially local costs, are therefore more predictable. We have negotiated an overrun commitment with the GOI which requires the GOI to meet any shortfall in funds, either local currency or foreign exchange. The elements of the capital cost estimates summarized above are described in the following paragraphs.

4.41 Preliminary expenses. The major element in this category is IFFCO's product seeding program which is estimated at \$4,000,000. This includes the salaries and expenses of a field staff which will number about 400 when plant operation commences; advertising and publicity; rental of offices and storage facilities; and training expenses. Also included in this category is \$2,700,000 for expenses of CFI over and above CFI's contribution of \$1,000,000; \$850,000 for project management costs; and \$900,000 for start-up costs (initial raw materials, six months payroll costs of its entire plant operating personnel). The remainder of the costs are the expense incurred by IFFCO over the past three years, the estimated head office expenses during construction and office furniture and fixtures.

4.42 Land and site preparation. Includes land rental for plant sites and housing colonies, clearing the Kandla site, land fill at Kalol (the largest single element at \$750,000), fencing and compound walls. Of the total, about \$250,000 are firm costs and the remainder has been estimated. Land fill costs are based on initial tenders received from contractors.

4.43 Ammonia plant. Estimate is based on a negotiated contract with M. W. Kellogg Company. Of the total foreign exchange costs, \$13,465,000 are firm if the contract is executed by June 30, 1971. The price will be escalated by \$132,000 if contract execution is delayed by a month; a delay longer than one month will require the renegotiation of the price. The local currency costs are all reimbursable and have been estimated by IFFCO in consultation with Kellogg and Kellogg's subcontractor, Engineers India Ltd.

4.44 Urea plant. Estimate is based on a negotiated contract with Humphreys and Glasgow Ltd. of which foreign exchange costs of \$4,500,000 are firm and \$,600,000 (equipment) are firm but subject to escalation based on U. K. economic indices. The remainder, primarily local currency costs, is reimbursable. The estimate of the local currency costs was prepared by H & G's Indian subsidiary and reviewed by IFFCO.

4.45 Complex plant. Estimate is based on a negotiated contract with Dorr-Oliver India Ltd. of which \$2,000,000 is firm and \$4,000,000 (Indian equipment) is firm but subject to escalation based on Indian economic indices. The remainder is reimbursable (construction, freight, spare parts, piling).

4.46 Offsites. Estimate is based on a definitive engineering study done, at Kalol by H & G, and at Kandla by Dorr-Oliver.

4.47 Work outside battery limits. This category represents infrastructure, and enabling works-or work that does not effect plant operation but is necessary for overall operation. Examples are: the housing colonies (\$2,667,000), the railway tank wagons that will haul ammonia from Kalol to Kandla (\$1,000,000), and railway lines to the plant sites and within-plant trackage (\$2,400,000). Most estimates are based on firm quotations received from suppliers.

4.48 Escalation. Each item of cost has been studied and, except for prices that are fixed, an escalation formula has been applied (depending on the nature and origin of the cost). Overall escalation as a percentage of project costs is 8.5 per cent. Considering the advanced stage of the project and the percentage of costs that are fixed, we consider the amount provided adequate.

4.49 Contingency. Since all of the major contracts have been negotiated and detailed discussions have been held with most suppliers and engineers, the need for a large contingency is diminished. The overall contingency, as a percentage of project costs, is 8.0 percent.

4.50 Interest during construction. Estimated by preparing a drawdown schedule for all loans by quarters and applying the interest rate of the loans. We have checked the schedule and find it correct. The aggregate amount is \$8,893,000 equivalent.

4.51 Initial working capital. Developed by projecting cash needs for inventories and receivables less prudent short term borrowings.

Environmental Considerations in Plant Design and Operation

4.52 Ammonia Plant. The emissions from a modern ammonia plant are surprisingly small. Normally the principal air pollutant is carbon dioxide (CO₂). In the IFFCO ammonia plant the CO₂ generated will not be released to the atmosphere; rather it will be supplied to the adjacent urea plant where it will be utilized in the manufacturing process. Similarly, the ammonia in liquid form will be pumped "across the fence" for utilization as the primary raw material in the urea plant.

4.53 Residual ammonia contained in process condensate steam and the effluent from various drips and drains will be collected and treated in accordance with Indian Standards Institute (ISI) standards before discharge. The details for disposal of treated effluents are being worked out by the Gujarat Industrial Development Corporation (GIDC) in consultation with the Government of Gujarat State.

4.54 Urea Plant. An effluent treatment plant is incorporated in the facility design. The effluent from various drains and drips containing nitrogen concentrates will be collected in a self-contained system and treated in accordance with ISI standards before discharge off-site. The details of disposal are being worked out with the GIDC in consultation with the Government of Gujarat State.

4.55 With respect to gaseous emissions, traces of ammonia and carbon dioxide remaining along with inert gases at the end of the reaction cycle are removed in a scrubber before the gases are allowed to escape to the atmosphere.

4.56 Urea "dust" will be formed in the prilling tower. It can be controlled through a down-draft and water scrub system. The details of the system to be installed by the British contractor are not known to AID at this time; the subject will be further examined by AID with IFFCO and the UK-ODA consultant.

4.57 Complex (NPK) Plant. One of the more corrosive pollutant sources often associated with such a plant does not arise at Kandla in that phosphoric acid is imported as a raw material constituent rather than manufactured on the premises.

4.58 Dust and fume emission is a pervasive problem in a plant such as this where large quantities of fine chemical materials are mixed and transported. 100% control is not feasible -- technically or economically. However, a system of cyclones, collectors, and scrubbers are incorporated in the plant design to collect fumes and dust from critical areas and run them through water scrubbers to minimize escape to the atmosphere.

4.59 A self contained drain system will be provided to control the escape of phosphate, nitrate, and potash solutions. The effluents will be collected and treated in accordance with ISI standards before discharge into Kandla Creek.

V. Market.

5.1 Fertilizer production in India is not yet maintaining pace with the increase of consumption and, considering the slowness of new plant construction, the situation will not measurably improve in this decade. Table III shows fertilizer consumption and production for the period 1969-70 through 1973-74. Production figures through 1970-71 are actual; projections for later years are based on our best estimates of production. Consumption figures through 1970-71 are "estimated actual" and projections are based on a conservative 15 per cent growth rate.

TABLE III
(thousands of metric tons of nutrient)

<u>NITROGEN</u>					
Indian Fiscal Year	<u>1969-70</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>
Consumption	1400	1610	1850	2130	2450
Production	<u>712</u>	<u>828</u>	<u>1233</u>	<u>1616</u>	<u>1976</u>
Deficit	688	782	617	514	474
<u>PHOSPHATE</u>					
Consumption	450	520	600	685	780
Production	<u>221</u>	<u>223</u>	<u>324</u>	<u>375</u>	<u>435</u>
Deficit	229	297	276	310	345

5.2 Despite the fact that a large overall market for fertilizer exists in India, no producer can ignore the necessity of developing his own market because (1) the fertilizer deficit is not evenly distributed throughout India and pockets will exist where surplus supplies create competition; and (2) the GOI's policy is to cover its deficits by continuous imports which are not timed and allocated with sufficient accuracy to prevent an over-supply in some regions and occasionally, nationwide.

5.3 IFFCO has entered in agreements with all its cooperative shareholders which obligates the shareholders to:

- a. Purchase fertilizer each year in the same ratio to IFFCO's output as the members' share holdings are to total share capital. If the member does not take the fertilizer then any losses incurred by IFFCO in disposing of the fertilizer, as computed by a chartered accountant of IFFCO's choosing, must be reimbursed to IFFCO by the member within 90 days.
- b. Purchase fertilizer from other suppliers only over and above the expected supplies from IFFCO.
- c. Supply irrevocable confirmed revolving letters of credit against which fertilizer will be shipped.

- d. Assure that the commission to retailers is allocated properly.
- e. Provide storage satisfactory to IFFCO for 60 per cent of their yearly allocation from IFFCO.
- f. Participate in IFFCO's training programs to the degree IFFCO determines.
- g. Display only IFFCO's promotional literature.
- h. Permit access to all records relating to the sale of fertilizer manufactured by IFFCO and by other manufacturers.
- i. Allow IFFCO "the right to direct (i) distribution of the material and promotional work of its field staff to the most competent and productive [retailers] and (ii) the degree or percentage of concentration of sales of IFFCO's fertilizer through said [retailers]".
- j. Allow IFFCO the right to "take over temporarily the functions discharged by state or local [wholesalers] if it has been proven to the satisfaction of the Board of Directors of IFFCO that such societies are curtailing or hindering the distribution of IFFCO's fertilizers into the sale area determined to be essential to the marketing area of IFFCO."

5.4 Despite the fact that IFFCO has direct contact and agreements with all of its members, its distribution, shipping and financial arrangements will be only with the "Apex Marketing Federation" in each state (except for Uttar Pradesh where IFFCO will also deal with an "Apex Cane Federation") and will therefore be relatively simple to manage.

5.5 IFFCO has a natural market advantage over all other producers, since its owners are India's major distributors of fertilizer with substantial credit and storage facilities at their disposal. 1/ Individually, however, the Cooperative Societies vary in quality of management and efficiency.

5.6 IFFCO is aggressively attacking its marketing job. It now has a field staff of 200 people (8 regional managers, 12 area managers, 12 area agronomists, and 168 field representatives).

1/ See the original Capital Assistance Paper for a detailed analysis of the Cooperative system in India.

5.7 The initial marketing strategy has been to concentrate its efforts on "viable" societies 1/ in 57 districts in the seven northern states and 14 districts in the three southern states. IFFCO's seeding program commenced in the summer of 1970 with the distribution of 25,000 tons of NPK material. By December 31, 1970, all material had been sold and applied to the cultivators' fields. The distribution was confined to one-third of the sales points in the northern states. In 1971, the program will be increased to 100,000 tons and a second-third of the "viable" northern societies will be included, plus one-third of the viable southern societies. In 1972 and 1973 the program will increase to 200,000 tons and 300,000 tons, respectively, and the remaining societies will be included.

1/ A "viable" society is one that is financially solvent, has storage capacity and a full-time manager.

VI. Financial Analysis

6.1 The project will be financed from the following sources:

TABLE IV (In Thousands of U.S. Dollars)

<u>Item</u>	<u>Foreign Exchange</u>	<u>Local Currency</u>	<u>Total</u>
Equity:			
Cooperatives		12,000	12,000
Government of India	880 <u>1/</u>	23,120	24,000
Long Term Debt:			
A.I.D. Loan	20,600		20,600
U.K. Loan	15,893		15,893
I.D.B.I. Loan		<u>49,640</u>	<u>49,640</u>
Total Project Cost	37,373	84,760	122,133

6.2 A.I.D. Loan. The A.I.D. loan to IFFCO will be for a period of 15 years including a grace period of $4\frac{1}{2}$ years. The interest rate will be 8.5 percent. IFFCO will repay the loans to the G.O.I. in local currency, with maintenance of value. The GOI will repay the loan in dollars to A.I.D. over a 40 year period including a grace period of 10 years. The interest rate will be two percent during the grace period and three percent during the repayment period. The GOI will guarantee the loan. The loan agreement with IFFCO and Special Loan Repayment Procedure and Guarantee Agreement with the GOI are attached as Annexes J and K.

6.3 While the U.S. dollar costs of this project are estimated at \$20,600,000, we are requesting authorization of an additional loan of \$6,000,000 for a total of \$21,000,000. We believe this additional margin of \$400,000 is desirable in a project of this size; it will provide the flexibility necessary if costs should increase or of items now contemplated to be purchased in India or the U.K. are shifted to U.S. procurement.

6.4 U.K. Loan. The U.K. loan will be from a line of credit available to the GOI for project financing. The loan to the GOI is interest free and will be repaid over a 25-year period. The GOI will make a counter-part loan in rupees to IFFCO. In effect, IFFCO purchases the foreign exchange from the GOI, using a rupee loan from the GOI for this purpose. IFFCO will repay the GOI loan over a 15-year period including a grace period of 5 years. The interest rate will be 6 percent.

1/ Represents the foreign exchange cost of the process license for the urea plant, a fee payable to Stamicarbon, a Dutch firm. This cost is not eligible for financing under the U.K. loan.

6.5 The U.K. has authorized a loan of £ 7,000,000 (\$16,800,000) for the project. That amount also includes a margin to absorb cost escalation.

6.6 I.D.B.I. Loan. The Industrial Development Bank of India, a public sector intermediate credit institution, will authorize a local currency loan equivalent to \$49,640,000. The loan will be repaid over a 15-year period including a grace period of 4½ years. The loan will be guaranteed by the GOI and will carry an interest rate of 8.5 percent.

6.7 The initial capitalization of the project will be at a debt-to-equity ratio of 70:30 (2.33:1) which is in line with the financing plans for many large projects in developing countries. The ratio is expected to deteriorate in the initial operating years as a result of projected losses but improves from the fifth operating year forward. (The losses are book losses due to a conservative depreciation policy--the project is expected to have a cash profit in every year but the first.) The debt service coverage is calculated in Annex D. It shows that, except for the first partial operating year (FY 1974), IFFCO will be able to cover its fixed debt almost two times. This calculation is on a year-to-year basis; if carryovers (previous year's net cash) were considered the ratio would increase substantially from one year to the next. We therefore believe that the amount of debt to be carried by IFFCO is not excessive.

6.8 Annex B shows IFFCO's projected profitability through 1986. The calculations are based on the following assumptions:

a. Production. 60 percent in the initial operating year, 70 percent in the second year, 90 percent in the third year and 100 percent thereafter. While percentages assumed for the initial operating years are consistent with experience in India, the projection for the years after the third are higher than current experience in India would justify. Given the demonstrated reliability of the prototype plant and the experience of CFI in operating it, we believe, however, that 100 percent production efficiency will be reached. "Capacity" production on an annual basis has, however, been calculated allowing 35 days a year for shutdowns, more than the U.S. cooperatives' experience with identical plants would indicate.

b. Sales Prices. Sales prices have been assumed, as follows:

TABLE V (In U.S. Dollars per M/T)

<u>Product</u>	<u>Current Sales Prices</u>	<u>Duty, Freight and Distributors Commission</u>	<u>Current Plant Netback</u>	<u>IFFCO Projectio</u>
Urea	123	30	93	86
14-36-12	166	33	133	126
12-32-16	153	33	120	113
10-26-26	150	33	117	110

We believe that these assumptions provide a sufficient margin.

c. Raw materials. Contracts for the major raw materials, supplies and utilities have been concluded and the contract prices have been used.

d. Labor. Costs are based on IFFCO's current salary schedule and increased by 5 percent each year.

e. Depreciation. Based on the "written down value" method (identical to U.S. double declining balance method) and is very conservative.

f. Income taxes. Allows for the tax benefits available to new industries in India (i.e., investment credit, tax holiday and special concessions to priority industries) which defers income taxes for a period of 7 years. After the benefits are exhausted the tax rate is 44 percent (a cooperative rate).

6.9 With these assumptions, which we believe to be realistic, IFFCO earns a book profit in its third year of operations of \$1.6 million; the profit increases gradually to a range of \$15 to \$17 million. At this rate, the return to the shareholders is an attractive 40 to 50 percent and the return on total investment is between 15 to 20 percent. Dividends are projected at a conservative 6 percent rate which, if the projections materialize, is likely to be increased substantially.

6.10 Annexes A and C show the Projected Balance Sheets and Sources and Applications of Funds Statements through 1986. The statements are self-explanatory and, except for the projection of a large cash build-up which will probably be used to either prepay debt, increase dividends or new investment, are realistic. The current ratio at start-up is slightly higher than 2:1 and reduces to 1.4:1 in the second operating year, returning to above 2:1 from the fourth year onward.

VII. Economic Analysis

7.1 Factors entering into the economic analysis of the project have not changed. The analysis presented in the 1969 loan paper is, therefore, still valid.

7.2 Fertilizer remains a key ingredient in the Indian strategy for agricultural and economic development and will remain so in the years ahead. Domestic production capacity is not expected to catch up with consumption and heavy imports will therefore be required for the foreseeable future.

Size of Plants

7.3 Capacities of the various battery limits plants in the project were selected on the basis of the best current practice in design of plants, coordination of material balance among the interconnected units and marketability of the product.

7.4 The Ammonia Plant capacity of 1000 short tons per day (910 MT/D) is the most commonly constructed size today which means the equipment as well as overall plant design has been well proven. Kellogg alone has designed and built over 30 such plants, all identical except for improvements suggested by operating experience. Plants of less than 600 short tons per day are no longer economical since they require reciprocating compressors which use very large amounts of electric power. A number of plants of approximately 600 tons per day have been built, including five now under construction in India. Thousand ton per day plants are, however, more economical to operate and equipment for them is more standardized, especially among American manufacturers. Some larger plants also have been built, up to 1500 tons per day. These are at the upper limit of today's technology and the economic benefits over the 1000-ton per day plant are marginal.

7.5 A 1200 MT/D Urea Plant is optimum for IFFCO since it uses the bulk of the ammonia from the 910 MT/D ammonia plant, leaving a sufficient quantity available for a properly sized NPK plant. A similar 1200 MT/D Stamicarbon plant has been built and is in operation at the Triad Chemical Co. plant in Donaldsonville, La. which indicates equipment of comparable size has been successfully operated. Marketing studies indicate IFFCO can sell the full yearly production in its market area.

7.6 The NPK Plant is sized for two 30/MT/Hr parallel trains (basis DAP), one train using blungers and the other using a granulator for maximum operating flexibility. The Dorr-Oliver equipment for this size plant is well tested. The residual ammonia from IFFCO's Kalol plant is adequate to meet requirements of the NPK plant with only a small amount left over for outside sales. Market studies indicate that IFFCO can adequately dispose of the total product of the plant within its market area.

Economic Profitability of Project

7.7 The computation of national economic profitability is based on the following ground rules:

- a. Only economic resources such as expenditure on plant, equipment, inventory and materials are considered. Financial flows such as accounts receivable, depreciation and interest paid on local debt are excluded. Taxes, duties, and other transfer payments within India are excluded. Resource flows are divided into local currency costs and foreign exchange costs.
- b. Inputs which enter into India's normal international trade are valued at the C.I.F. prices for imports, whether actually imported by IFFCO or not, while outputs are valued at the Indian FOB price for exports. IFFCO's ex-plant fertilizer sales are valued at the current C.I.F. prices of imported fertilizer which gives a relatively low resource inflow projection due to the current depressed state of the international fertilizer market. Raw materials are valued at C.I.F. prices plus local freight, although ocean freight and insurance are treated as local currency costs.
- c. The prices of natural gas and associated gas have been valued at their opportunity cost, estimated to be the value of the equivalent fuel oil calculated in terms of BTU's. (See footnotes to table on National Economic Profitability.)

7.8 The income statement and balance sheet projections which formed the basis of the national economic profitability calculation were provided by IFFCO and were used as indicated above.

7.9 The results of the national economic profitability calculation are given in Annexes E and F. Assuming no premium for foreign exchange, the internal rate of return for the project is slightly above 6%. If we allow a foreign exchange premium of 15.6%, equivalent to a rate of Rs. 8.67 per dollar, the internal rate of return is 10%. If the foreign exchange premium is increased to 31.6%, equivalent to an exchange rate of Rs. 9.87 per dollar, the internal rate of return rises to 13%. Since the shadow rate of foreign exchange is generally considered to be within the range of the last two rates mentioned above, the project is considered as meeting the standards for national economic profitability in India, a range of 10% to 15%.

VIII. Implementation.

8.1 During the construction phase the IFFCO organization will consist of three divisions - head office, operations and marketing.

8.2 The Head Office Division will be located in New Delhi and will have responsibility for government liaison, negotiation of all contracts, obtaining import licenses, customs clearance, budgeting and corporate planning. The Managing Director will have prime responsibility for this division and will be assisted by a financial advisor (appointed by the GOI) and an administrative officer (a member of the Indian Administrative and Accounts Service) and the requisite supporting staff.

8.3 The Marketing Division will also be headquartered in New Delhi but will have field offices in each state headed by an area manager. The senior marketing officer is an Indian national with substantial cooperative experience. The Marketing Division is being assisted by two CFI advisors both of whom are now resident in India.

8.4 The Operations Division will have full responsibility for the construction, training of personnel and operation of the plants. The Operations Division is headed by the Operations Manager, an expatriate made available by CFI. Reporting to the Operations Manager will be Project Managers at each site (both CFI personnel) who will have a staff of American and Indian Engineers. These staffs, which now consist of approximately 20 professionals, will be increased as the project progresses. The majority will be phased into plant operations. At the peak of construction activity and during plant start-up personnel will number approximately 30. Five are now resident in India, including the Operations Manager and the two Project Managers. One CFI employee is now resident in U.K. working with the urea plant contractor during the initial design and engineering phase; he will transfer to the site when construction begins.

8.5 The three major contractors have already started work under preliminary agreements permitting them to undertake the work necessary to determine the source of equipment supply (Indian or offshore) prior to execution of the final contract. This method of contracting is expected to save approximately three months compared to the usual procedure under which the contractors' work would begin only after completion of all financial arrangements. Taking into account the work being performed under the preliminary agreements, the project schedule is as follows:

TABLE VI

<u>Plant</u>	<u>Effective Contract Date</u>	<u>Construction Period</u>	<u>Completion Date</u>
Ammonia	July 1, 1971	30	December 31, 1973
Urea	July 1, 1971	33	March 31, 1974
Complex	July 1, 1971	27	September 30, 1973

8.6 Each contractor will guarantee his completion schedule under a bonus/penalty arrangement. The bonus/penalty amounts agreed to are as follows:

TABLE VII

<u>Contractor</u>	<u>Grace Period</u>	<u>Penalty/Bonus Per Day</u>	<u>Maximum</u>
M.W. Kellogg	45	\$1,315	\$230,000
Humphreys & Glasgow	45	\$1,716	\$300,000
Dorr Oliver	30	Rs4,500	Rs810,000

8.7 The contractors for the urea and the complex plants have agreed to train a nucleus of IFFCO's operations personnel in similar plants. The remainder of the staff will be trained at the sites during the final phases of construction. CFI will arrange for the training of the ammonia plant operating staff in plants owned by its members.

8.8 In order to prevent competition between the contractors for construction labor, shop space and construction tools, the contractors have agreed to adhere to a joint schedule controlled by IFFCO's Operations Division. This master schedule will be developed by IFFCO jointly with the contractors shortly after execution of the contracts.

8.9 We have reviewed all major contracts in their draft forms and consider the terms and conditions embodied in those agreements to be complete and reasonable. The draft Loan Agreements

have been approved by IFFCO's Board of Directors and the Government of India. We are presently working with other lenders to assure that their agreements are consistent with our agreements.

8.10 None of the major contracts were let for competitive bidding. A waiver of this provision of A.I.D.'s Capital Projects Guidelines is now in process.

IX. IMPACT ON THE U.S. ECONOMY

9.1 All equipment and services financed by the loan will be from U.S. sources. At least one-half of all ocean transportation will be on U.S. carriers. Substantial follow-on purchases in the U.S. are expected; it is estimated that the foreign exchange requirements, predominantly from the U.S., of maintenance spares, catalysts and chemicals will be more than \$1 million per year.

9.2 Repayments prospects are good. Since securing its independence in 1947 India has faithfully met the payments of interest and principal on its international obligations. The ability of the GOI to repay the loan ultimately depends upon the rate of its economic development, the growth of the country's exports and its other foreign exchange earnings.

9.3 There will be some marginal competition between this project and other Indian fertilizer companies in which U.S. companies own minority interests. However, for the foreseeable future the supply/demand projections indicate a shortfall in domestic production. (See Section V).

9.4 India currently imports a substantial amount of fertilizer from the U.S., all of it AID financed. Fertilizer produced by this project will replace such U.S. exports. Because of raw material costs and transportation charges, however, the U.S. would not export significant quantities of finished fertilizer to India if it were not AID financed.

Indian Farmers Fertiliser Cooperative Limited

Projected Balance Sheet for the

Year ending June 30

(In thousands of dollars)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Current Assets:													
Cash	2,506	10,599	18,359	30,786	43,800	57,906	64,040	67,801	74,303	60,294	85,682	91,093	104,413
Receivables	3,866	9,053	12,933	12,933	12,933	12,933	12,933	12,933	12,933	12,933	12,933	12,933	12,933
Inventories	1,560	2,260	2,867	2,867	2,867	2,867	2,867	2,867	2,867	2,867	2,867	2,867	2,867
Other current assets	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413
	<u>11,345</u>	<u>25,325</u>	<u>37,572</u>	<u>49,999</u>	<u>63,013</u>	<u>77,119</u>	<u>83,253</u>	<u>87,014</u>	<u>93,521</u>	<u>92,507</u>	<u>104,895</u>	<u>110,306</u>	<u>121,626</u>
Fixed Assets	115,387	115,387	115,387	115,387	115,387	115,387	115,387	115,387	115,387	115,387	115,387	115,387	115,387
Less Depreciation	22,493	40,187	54,187	65,280	74,120	81,199	86,866	91,440	95,160	93,174	100,641	102,655	104,322
Net Fixed Assets	<u>92,894</u>	<u>75,200</u>	<u>61,200</u>	<u>50,107</u>	<u>41,267</u>	<u>34,188</u>	<u>28,521</u>	<u>23,947</u>	<u>20,227</u>	<u>17,213</u>	<u>14,746</u>	<u>12,732</u>	<u>11,065</u>
Total Assets	<u>104,239</u>	<u>100,505</u>	<u>98,772</u>	<u>100,106</u>	<u>104,280</u>	<u>111,307</u>	<u>111,774</u>	<u>110,961</u>	<u>113,748</u>	<u>116,720</u>	<u>119,641</u>	<u>123,038</u>	<u>134,691</u>
Current Liabilities:													
Loans from Banks	4,360	8,293	11,853	11,853	11,853	11,853	11,853	11,853	11,853	11,853	11,853	11,853	11,853
Accounts Payable	933	2,106	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013
Current Maturities: Long-term Loans:													
USAID Dollar Loan	-	2,030	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	1,880	-	-
UK £ Loan	-	800	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	693	-
Rupee Loan	-	4,933	4,933	4,933	4,933	4,933	4,933	4,933	4,933	4,933	5,243	-	-
	<u>2,293</u>	<u>18,212</u>	<u>23,479</u>	<u>23,479</u>	<u>23,479</u>	<u>23,479</u>	<u>23,479</u>	<u>23,479</u>	<u>23,479</u>	<u>23,479</u>	<u>23,589</u>	<u>15,559</u>	<u>14,866</u>
Long Term Loans (Net of Current):													
USAID Dollar Loan	20,600	18,520	16,440	14,360	12,280	10,200	8,120	6,040	3,960	1,880	-	-	-
UK £ Loan	15,693	15,693	13,493	11,893	10,293	8,693	7,093	5,493	3,893	2,293	693	-	-
Rupee Loan	48,640	44,707	37,774	34,841	29,908	24,975	20,042	15,109	10,176	5,243	-	-	-
Total	<u>84,933</u>	<u>78,920</u>	<u>67,707</u>	<u>61,094</u>	<u>52,481</u>	<u>43,868</u>	<u>35,255</u>	<u>26,642</u>	<u>18,029</u>	<u>9,416</u>	<u>693</u>	<u>-</u>	<u>-</u>
Total Liabilities	<u>91,426</u>	<u>96,532</u>	<u>91,186</u>	<u>84,573</u>	<u>75,960</u>	<u>67,347</u>	<u>58,734</u>	<u>50,121</u>	<u>41,508</u>	<u>32,895</u>	<u>24,202</u>	<u>15,559</u>	<u>14,866</u>
Net worth													
Share Capital	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000
Retained Earnings	(23,187)	(32,027)	(30,414)	(20,467)	(7,620)	7,960	17,040	24,840	36,240	47,825	59,359	71,479	83,825
	<u>12,813</u>	<u>3,973</u>	<u>5,586</u>	<u>15,533</u>	<u>28,320</u>	<u>43,960</u>	<u>53,040</u>	<u>60,840</u>	<u>72,240</u>	<u>83,825</u>	<u>95,359</u>	<u>107,479</u>	<u>119,825</u>
	<u>104,239</u>	<u>100,505</u>	<u>98,772</u>	<u>100,106</u>	<u>104,280</u>	<u>111,307</u>	<u>111,774</u>	<u>110,961</u>	<u>113,748</u>	<u>116,720</u>	<u>119,641</u>	<u>123,038</u>	<u>134,691</u>

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ANNEX A

Indian Farmers Fertilizer Cooperative Limited

Profit and Loss Statement

For the Years ending June 30

(In Thousands of Dollars)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
No. of working days	90	330	330	330	330	330	330	330	330	330	330	330	330
Output to installed capacity	15	70	90	100	100	100	100	100	100	100	100	100	100
Production quantity in metric tons:													
Urea	57,315	267,470	343,890	382,100	382,100	382,100	382,100	382,100	382,100	382,100	382,100	382,100	382,100
Ammonia	1,980	9,240	11,880	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
NPK 14-36-12	28,485	132,930	170,910	189,900	189,900	189,900	189,900	189,900	189,900	189,900	189,900	189,900	189,900
12-32-16	13,920	64,960	83,520	92,800	92,800	92,800	92,800	92,800	92,800	92,800	92,800	92,800	92,800
16-26-26	13,920	64,960	83,520	92,800	92,800	92,800	92,800	92,800	92,800	92,800	92,800	92,800	92,800
Sales	<u>11,746</u>	<u>54,787</u>	<u>70,440</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>	<u>78,267</u>
Expenses:													
Raw materials	5,907	25,747	33,213	36,093	36,093	36,093	36,093	36,093	36,093	36,093	36,093	36,093	36,093
Utilities	507	1,360	1,560	1,560	1,560	1,560	1,560	1,560	1,560	1,560	1,560	1,560	1,560
Bags & supplies	706	3,227	4,147	4,613	4,613	4,613	4,613	4,613	4,613	4,613	4,613	4,613	4,613
Labor, insurance & chemicals	2,347	6,320	6,747	6,694	6,720	6,760	6,707	6,800	6,893	6,987	7,080	7,173	7,267
Depreciation	22,493	17,693	14,000	11,093	8,840	7,080	5,667	4,574	3,720	3,014	2,467	2,014	1,667
Selling expenses	267	1,813	1,893	1,973	2,054	2,134	2,213	2,294	2,374	2,453	2,534	2,613	2,694
Interest	<u>2,706</u>	<u>7,467</u>	<u>7,267</u>	<u>6,294</u>	<u>5,600</u>	<u>4,387</u>	<u>3,694</u>	<u>3,000</u>	<u>2,294</u>	<u>1,614</u>	<u>920</u>	<u>214</u>	<u>-</u>
Total Expenses	<u>34,933</u>	<u>63,627</u>	<u>68,827</u>	<u>68,320</u>	<u>65,480</u>	<u>62,627</u>	<u>60,547</u>	<u>58,934</u>	<u>57,547</u>	<u>56,334</u>	<u>55,267</u>	<u>54,280</u>	<u>52,894</u>
Net profit before income tax	(23,187)	(8,840)	1,613	9,947	12,787	15,640	17,720	19,333	20,720	21,933	23,000	23,987	24,373
Income tax	-	-	-	-	-	-	-	2,893	7,160	8,187	9,307	9,707	9,857
Net profit after income tax	<u>(23,187)</u>	<u>(8,840)</u>	<u>1,613</u>	<u>9,947</u>	<u>12,787</u>	<u>15,640</u>	<u>17,720</u>	<u>16,440</u>	<u>13,560</u>	<u>13,746</u>	<u>13,693</u>	<u>14,280</u>	<u>14,506</u>
Retained earnings - beginning of year	-	(23,187)	(32,027)	(30,414)	(20,467)	(7,680)	7,960	17,040	24,840	26,240	47,826	59,359	71,479
	<u>(23,187)</u>	<u>(32,027)</u>	<u>(30,414)</u>	<u>(20,467)</u>	<u>(7,680)</u>	<u>7,960</u>	<u>25,680</u>	<u>33,480</u>	<u>38,400</u>	<u>49,986</u>	<u>61,519</u>	<u>73,639</u>	<u>85,935</u>
Less dividends	-	-	-	-	-	-	8,640	8,640	2,160	2,160	2,160	2,160	2,160
Retained earnings - end of year	<u>(23,187)</u>	<u>(32,027)</u>	<u>(30,414)</u>	<u>(20,467)</u>	<u>(7,680)</u>	<u>7,960</u>	<u>17,040</u>	<u>24,840</u>	<u>36,240</u>	<u>47,826</u>	<u>59,359</u>	<u>71,479</u>	<u>83,825</u>

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ANNEX B

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Indian Farmers Fertiliser Cooperative Limited

Sources & Application of Funds

Year ending June 30

(In Thousands of Dollars)

	Thru FY 1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Funds Provided from:													
Operations:													
Net Income before taxes	(23,187)	(8,840)	1,613	9,947	12,787	15,640	17,720	19,333	20,720	21,933	23,000	23,987	24,373
Depreciation	<u>22,493</u>	<u>17,693</u>	<u>14,000</u>	<u>11,093</u>	<u>8,840</u>	<u>7,080</u>	<u>5,667</u>	<u>4,574</u>	<u>3,720</u>	<u>3,014</u>	<u>2,467</u>	<u>2,014</u>	<u>1,667</u>
	(694)	8,853	15,613	21,040	21,627	22,720	23,387	23,907	24,440	24,947	25,467	26,001	26,040
Capital Stock	35,000	-	-	-	-	-	-	-	-	-	-	-	-
Long-term Debt:													
USAID Dollar Loan	20,600	-	-	-	-	-	-	-	-	-	-	-	-
UK £ Loan	15,893	-	-	-	-	-	-	-	-	-	-	-	-
Rupee Loan	<u>49,640</u>	-	-	-	-	-	-	-	-	-	-	-	-
	<u>121,439</u>	<u>8,853</u>	<u>15,613</u>	<u>21,040</u>	<u>21,627</u>	<u>22,720</u>	<u>23,387</u>	<u>23,907</u>	<u>24,440</u>	<u>24,940</u>	<u>25,467</u>	<u>26,001</u>	<u>26,040</u>
Funds Applied for:													
Fixed Assets	115,387	-	-	-	-	-	-	-	-	-	-	-	-
Debt Repayments:													
USAID Dollar Loan	-	-	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	1,880	-
U.K. £ Loan	-	-	800	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	693
Rupee Loan	-	-	4,933	4,933	4,933	4,933	4,933	4,933	4,933	4,933	4,933	5,243	-
Taxes	-	-	-	-	-	-	-	2,893	7,160	8,187	9,307	9,707	9,867
Dividends	-	-	-	-	-	-	8,640	8,640	2,160	2,160	2,160	2,160	2,160
Redemption of GOI Shares	-	-	-	-	-	-	-	-	-	-	-	-	-
Increase (decrease) in working capital excluding current maturities	6,052	8,853	7,700	12,427	13,014	14,107	6,134	3,761	6,507	5,987	5,387	5,411	13,320
	<u>121,439</u>	<u>8,853</u>	<u>15,513</u>	<u>21,040</u>	<u>21,627</u>	<u>22,720</u>	<u>23,387</u>	<u>23,907</u>	<u>24,440</u>	<u>24,947</u>	<u>25,467</u>	<u>26,001</u>	<u>26,040</u>

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ANNEX C

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INDIAN FARMERS FERTILIZER COOPERATIVE LTD.
CALCULATION OF DEBT COVERAGE RATIO

	(In Thousands of Dollars)													
	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	
DEBT COVERAGE RATIO:														
1. Net Funds Provided from Profit	(23,187)	(2,840)	1,613	9,947	12,767	15,640	17,720	16,440	13,560	13,746	13,693	14,280	14,506	
2. Depreciation	22,493	17,693	14,030	11,093	8,640	7,020	5,667	4,574	3,720	3,014	2,467	2,014	1,667	
3. Interest Charges	2,706	7,467	7,267	6,294	5,600	4,387	3,694	3,000	2,294	1,614	920	214	-	
4. Total Funds Available for Debt Repayment.	<u>2,012</u>	<u>16,320</u>	<u>22,880</u>	<u>27,334</u>	<u>27,227</u>	<u>27,107</u>	<u>27,081</u>	<u>24,014</u>	<u>19,574</u>	<u>18,374</u>	<u>17,080</u>	<u>16,508</u>	<u>16,173</u>	
5. Interest Payments	2,706	7,467	7,267	6,294	5,600	4,387	3,694	3,000	2,294	1,614	920	214	-	
6. Principal Repayments:														
USAID Dollar Loan	-	-	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	1,880	-	
U.K. £ Loan	-	-	800	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	693	
Rupee Loan	-	-	4,933	4,933	4,933	4,933	4,933	4,933	4,933	4,933	4,933	5,243	-	
7. Total 5 and 6	<u>2,706</u>	<u>7,467</u>	<u>15,080</u>	<u>14,907</u>	<u>14,213</u>	<u>13,000</u>	<u>12,307</u>	<u>11,613</u>	<u>10,907</u>	<u>10,227</u>	<u>9,533</u>	<u>8,937</u>	<u>693</u>	
8. Debt Coverage Ratio (4 divided by 7)	0.74	2.19	1.5	1.8	1.9	2.1	2.2	2.1	1.8	1.8	1.8	1.8	23.3	

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Indian Farmers Fertilizer Cooperative Limited
Resource Inflow/Outflow for National Economic Profitability Computation
(All figures in thousands of dollars)

	Footnotes	FY 1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Percentage of Output		-	-	15	70	90	100	100	100	100	100	100	100	100	100	100
<u>Production quantity in MT:</u>	1/			58,600	274,400	352,800	392,000	392,000	392,000	392,000	392,000	392,000	392,000	392,000	392,000	392,000
Urea				39,750	185,500	238,500	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000
DAP (equivalent)				16,350	76,300	93,100	109,000	109,000	109,000	109,000	109,000	109,000	109,000	109,000	109,000	109,000
Potash (")				1,980	9,340	11,880	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
Ammonia																
<u>Foreign Exchange</u>																
Value of Production	2/			4,234	19,756	25,402	28,224	28,224	28,224	28,224	28,224	28,224	28,224	28,224	28,224	28,224
Urea				3,220	15,026	19,320	21,465	21,465	21,465	21,465	21,465	21,465	21,465	21,465	21,465	21,465
DAP				785	3,662	4,709	5,232	5,232	5,232	5,232	5,232	5,232	5,232	5,232	5,232	5,232
Potash				79	370	475	528	528	528	528	528	528	528	528	528	528
Ammonia																
A. Total Inflows		-	-	8,318	38,814	47,906	55,449	55,449	55,449	55,449	55,449	55,449	55,449	55,449	55,449	55,449
<u>Costs:</u>																
Project Investment	5/	11,257	18,760	5,628	1,876											
Raw Materials	3/			3,557	16,601	21,344	23,715	23,715	23,715	23,715	23,715	23,715	23,715	23,715	23,715	23,715
Production Cost	3/			119	553	711	790	790	790	790	790	790	790	790	790	790
Additions to Inventories & Current Assets	6/			2,049	157	128										(2,332)
B. Total Foreign Exchange Cost		11,257	18,760	11,344	19,187	22,183	24,505	24,505	24,505	24,505	24,505	24,505	24,505	24,505	24,505	22,173
C. Net Foreign Exchange Inflow (Outflow) (A-B)		(11,257)	(18,760)	(3,026)	19,627	27,723	29,944	29,944	29,944	29,944	29,944	29,944	29,944	29,944	29,944	33,276
<u>Local Currency Costs</u>																
Project Investment	5/	19,637	32,728	9,818	3,273											(11,065)
Raw Materials	3/			939	4,381	5,635	6,262	6,262	6,262	6,262	6,262	6,262	6,262	6,262	6,262	6,262
Production Cost	3/ 4/			1,674	7,812	10,034	11,160	11,185	11,226	11,173	11,173	11,359	11,453	11,546	11,639	11,733
Additions to Inventories & Other Current Assets	6/			1,235	454	370										(2,759)
D. Total Local Currency Cost		19,637	32,728	14,366	15,922	16,050	17,422	17,448	17,483	17,435	17,435	17,621	17,715	17,803	17,901	4,171
Net Inflows (Outflows) (C-D)		(20,824)	(51,493)	(17,392)	3,705	11,673	13,522	13,476	13,456	13,509	13,509	13,323	13,239	13,136	13,043	29,095

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IFFCO FERTILIZER PROJECTFootnotes for Table on National Economic
Profitability

1. Equivalent imports of DAP and potash were substituted for IFFCO N.P.K. production. Full capacity production will be 392,000 MT urea, 265,000 MT DAP, and 109,000 MT potash. These are the same production figures as used in the 1969 loan paper. In addition, it is now estimated that 13,200 MT of ammonia will be available for sale to industrial users. Production is assumed to be 15% of full capacity in 1974, 70% in 1975, 90% in 1976 and 100% in 1977.

2. Fertilizer sales prices are based on the average 1970 C&F import prices paid by India. These prices were provided by the Ministry of Supply and Trade and were as follows: Urea \$72/MT, DAP \$81/MT and potash \$48/MT. In addition, ammonia was assumed to be \$40/MT, its current CIF price.

It should be pointed out that all of these prices are lower than the estimates used in the 1969 loan paper. International fertilizer prices have fallen significantly

in the last two years due to excess production capacity worldwide. It appears now that international prices will stabilize or at least not fall significantly lower. Using the 1970 average C&F import prices would appear to give conservative projection for sales.

3. Operating costs including raw materials and production costs have been split into foreign exchange and local currency components. Any direct IFFCO input which enters India's foreign trade, whether actually imported by IFFCO or not, is priced at the CIF import price. The FOB portion is treated as a foreign exchange cost, while the freight, handling, etc. is treated as a local currency cost.

Fuel oil, naptha, natural gas, and associated gas were affected in particular by these assumptions. Each input is produced from oil and gas fields in Gujarat and refined in Baroda. However, in each case an international price was used rather than the domestic price. Naptha was priced at the \$15/MT FOB India export price, fuel oil at the FOB import price (\$13.60/MT) and the natural and associated gas at \$13.60/MT on the equivalent fuel oil (in terms of BTU's).

The value of natural gas and associated gas is assumed to be its opportunity cost. The opportunity cost of gas, as determined by its next best alternative use, should be roughly equal to the CIF value of an equivalent amount (expressed in BTU's) of imported fuel oil. This is because the next best alternative use of the gas, within any reasonable period of time, appears to be as a fuel in a thermal electric generating plant (the GOI was actively considering this alternative). Because fuel oil is the alternative power source for the generating plant, it appears reasonable to argue that the value of natural and associated gas is no greater than the equivalent amount of fuel oil expressed in BTU's.

Production costs were reduced by 10% on the local currency portion of materials for sales tax and by 27.1/2 on the foreign exchange portion for import duty. Direct sales taxes and import duties were also excluded from the raw material costs.

4. Selling expenses have not been included because the fertilizer is priced at estimated CIF prices rather than at estimated sales price leaving no margin for local selling costs in the inflow side of the calculation.

5. Project investment costs have been broken into foreign exchange and local currency costs. Sales taxes, import duties, working capital, and the local currency portion of interest payments during the construction period have been excluded. Also excluded is a \$700,000 grant by CFI which India would receive only if it built the IFFCO plants.

Project investment costs have been phased at 30% 1st year, 50% 2nd year, 15% 3rd year, and 5% 4th year for both the foreign exchange and local currency portions. Salvage value is assumed to be \$11,065,000 or the undepreciated fixed assets at end of project.

6. Additions to inventories and to other current assets were treated as a resource flow and split between local currency and foreign costs. The working capital excluded from project investment costs is reflected in these additions. Foreign exchange was estimated at 30% of total inventory costs and 69% of total other current assets by IFFCO. Import duties of 27.1/2% were excluded on the foreign exchange component and average sales taxes of 10% were excluded on the local currency component.

The net value of inventories and other current assets is assumed to be realized in the final year of the project.

IFFCO FERTILIZER PROJECT

Computation of National Economic Profitability

Discount Rate	Present Value of Net Inflow (Outflow) ^{1/}		Equalizing Premium ^{2/}	Ex Exch Rate Implied ^{3/}
	Foreign Exchange (FX)	Local Currency (LC)		
6%	177,753	(175,329)	- 1.4%	7.40
10%	121,333	(140,279)	+ 15.6%	8.67
13%	91,913	(120,932)	+ 31.6%	9.87
15%	75,418	(109,505)	+ 45.2%	10.89

1/ As shown in the table on resource inflow (outflow) for national economic profitability.

2/ The equalizing foreign exchange (FX) premium is the percentage increase in the official exchange rate of Rs. 7.50 per \$1.00 required for a zero net present value for the project at a given discount rate. It is computed according to following formula:

$$(100 + \text{FX premium}) \times (\text{Present value FX inflow/ outflow})$$

$$+ 100 \times (\text{Present value LC inflow/outflow}) = 0$$

3/ Computed as follows: $(100 + \text{Equalizing FX premium}) \times (7.50)$

Capital Assistance Loan Authorization

Provided from: Development Loan Funds

India: IFFCO Fertilizer Project

Pursuant to the authority vested in the Assistant Administrator of the Agency for International Development ("A.I.D."), Bureau for Near East and South Asia, by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby amend the Capital Assistance Loan Authorization for A.I.D. Loan No. 386-H-201, signed _____, 1969, to read as follows:

"Pursuant to the authority vested in the Administrator of the Agency for International Development (hereinafter referred to as "A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title I, the Development Loan Fund, to the Indian Farmers Fertilizer Cooperative Ltd. (hereinafter referred to as IFFCO), a cooperative organized under the laws of India, of not to exceed twenty-one million dollars (\$21,000,000) for the purpose of building fertilizer manufacturing facilities in India, this loan to be subject to the following terms and conditions:

- "1. IFFCO will pay the rupee equivalent of the loan to the Indian Government over a fifteen year period. The initial four and one-half years to be a grace period of principal. The interest rate will be eight and one-half (8-1/2%) for repayment on the disbursed balance of the loan. The Indian government will repay the loan in dollars to A.I.D. over a period of forty years. The initial ten years to be a grace period on principal. The interest rate will be two percent (2%) during the grace period, and three percent (3%) for the years thereafter.
- "2. All equipment, materials and services financed under this loan shall be procured in the United States.

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- "3. The Borrower shall provide satisfactory evidence that the local currency required for the project is available.
- "4. The Borrower shall provide satisfactory evidence that the additional foreign exchange required for the project is available.
- "5. The Borrower shall provide evidence that satisfactory arrangements have been made to construct, operate and maintain the Project as planned.
- "6. The loan shall be subject to such other terms and conditions as A. I. D. may deem advisable."

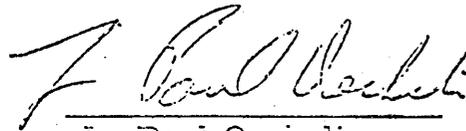
Assistant Administrator

Date

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CERTIFICATION PURSUANT TO SECTION 611(b) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, L. Paul Oechsli, the principal officer of the Agency for International Development in India, having taken into account, among other things, the maintenance and utilization of projects in India previously financed or assisted by the United States, do hereby certify that in my judgment India has both the financial capability and the human resources capability to effectively utilize the capital assistance to be provided by the Indian Farmers Fertilizer Cooperative, Ltd., loan.



L. Paul Oechsli
Director (Acting)

May 7, 1971
Date

CHECKLIST OF STATUTORY CRITERIA
DEVELOPMENT LOAN

The following abbreviations are used in the checklist:

FAA - Foreign Assistance Act of 1961, as amended, incorporating amendments effected by the Foreign Assistance Act of 1969 and the Special Foreign Assistance Act of 1971.

App. - Foreign Assistance and Related Programs Appropriation Act, 1971.

MMA - Merchant Marine Act of 1936, as amended.

I. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA Secs. 201(b)(5), 201(b)(7), 201(b)(8). Discuss the extent to which the country is:

(a) Making appropriate efforts to increase food production and improve means for food storage and distribution.

India is undertaking a high priority program for foodgrains production and is giving increasing attention to food storage and distribution.

(b) Creating a favorable climate for foreign and domestic private enterprise and investment.

India is endeavoring to take steps in this direction.

(c) Increasing the people's role in the developmental process.

India has a democratic form of government and encourages citizen participation in development through processes such as cooperatives, panchayats and the working of its democratic political system.

(d) Allocating expenditures to development rather than to unnecessary military purposes or intervention in other free countries' affairs.

India has a major commitment to development and does not so intervene.

(e) Willing to contribute funds to the project or program.

A substantial amount of the local costs of this project will be contributed by the Government of India.

(f) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements; and making progress towards respect for the rule of law, freedom of expression and of the press,

and recognizing the importance of individual freedom, initiative and private enterprise.

The GOI has made substantial efforts towards economic and social reforms. It has undertaken devaluation and liberalization measures. An Administrative Reforms Commission has been appointed and an AID/IRS tax assistance project has just been completed. India's adherence to the maintenance of the Rule of Law, individual freedom and freedom of expression and of the press is well recognized. Private initiative and enterprise are also regarded as having an important place in Indian economic development and democracy.

(g) Responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

India has been in the forefront of developing countries in responding to economic and social concerns of its peoples. Important self-help measures in particular have been taken in agriculture. Democratic processes of government provide a means of responding to political concerns.

B. Relations with the United States.

1. FAA Sec. 620(c). In the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies, including arbitration, or (b) the debt is not denied or contested by the government, or (c) the indebtedness arises under such government's, or a predecessor's unconditional guarantee?

India is not ineligible under this section.

2. FAA Sec. 620(d). If the loan is intended for construction or operation of any productive enterprise that will compete with U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the U.S. of more than 20% of its enterprise's annual production during the life of the loan?

Borrower will not compete with U.S. enterprise as for the foreseeable future there will be a shortfall in fertilizer production in India necessitating imports. Under agreements with cooperator shareholders all output must be offered to shareholders.

3. FAA Sec. 620(e)(1). Has the country's government, or any agency or subdivision thereof, (a) nationalized or expropriated property owned by U.S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate or nullify existing contracts or agreements with such citizens or entity, or (c) imposes or enforced discriminatory taxes or other exactions, or restrictive maintenance or operation conditions? If so, and more than six months has elapsed since such occurrence, identify the document indicating that the government, or appropriate agency or subdivision thereof, has taken appropriate steps to discharge its obligations under international law toward such citizen or entity? If less than six months has elapsed, what steps if any has it taken to discharge its obligations?

India is not ineligible under this section.

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4. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction?

No.

5. FAA Sec. 620(l). Has the government instituted an investment guaranty program under FAA Sec. 211(b)(1) for the specific risks of inconvertibility and expropriation or confiscation?

India has instituted the program.

6. FAA Sec. 620(o). Fisherman's Protective Act of 1954, as amended, Section 5. Has the country seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters? If, as a result of a seizure, the U.S.G. has made reimbursement under the provisions of the Fisherman's Protective Act and such amount has not been paid in full by the seizing country, identify the documentation which describes how the withholding of assistance under the FAA has been or will be accomplished.

India is not ineligible under this section.

7. FAA Sec. 620(q). Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan?

No.

8. FAA Sec. 620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed?

No.

C. Relations with Other Nations and the U.N.

1. FAA Sec. 620(i). Has the country been officially represented at any international conference when that representation included planning activities involving insurrection or subversion directed against the U.S. or countries receiving U.S. assistance?

No.

2. FAA Secs. 620(a), 620(n). Has the country sold, furnished, or permitted ships or aircraft under its registry to carry to Cuba or North Vietnam items of economic, military, or other assistance?

No.

3. FAA Sec. 620(u); App. 108. What is the status of the country's U.N. dues, assessments, or other obligations? Does the loan agreement bar any use of funds to pay U.N. assessments, dues, or arrearages?

There is no such delinquency. Funds will not be used for the U.N. dues etc.

D. Military Situation.

1. FAA Sec. 620(i). Has the country engaged in or prepared for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance?

No.

2. FAA Sec. 620(s). Consideration should be given to the percentage of the countries' budget devoted to military purposes, the degree to which other makes of military equipment are used, and to the amount specified by one of the sophisticated weapon systems.

Due consideration has been given to this requirement.

II. CONDITION OF THE LOANA. General Soundness

-- Interest and Repayment

1. FAA Secs. 201(d), 201(b)(2). Is the rate of interest excessive or unreasonable for the borrower? Are there reasonable prospects for repayment? What is the grace period interest rate; the following period interest rate? Is the rate of interest higher than the country's applicable legal rate of interest?

The rate of interest is reasonable for India. India is considered to have the capacity to repay the loan. The interest rate during the grace period is 2% and thereafter 3%. The rate of interest is not higher than the country's applicable legal rate of interest.

-- Financing

1. FAA Sec. 201(b)(1). To what extent can financing on reasonable terms be obtained from other free-world sources, including private sources within the U.S.?

Part of the financing is being supplied by the United Kingdom through its aid program. Financing is not reasonably available from other sources.

-- Economic and Technical Soundness

1. FAA Secs. 201(b)(2), 201(e). The activity's economic and technical soundness to undertake loan; does the loan application, together with information and assurances, indicate that funds will be used in an economically and technically sound manner?

Yes.

2. FAA Sec. 611(a)(1). Have engineering, financial, and other plans necessary to carry out assistance, and a reasonably firm estimate of the cost of assistance to the U.S., been completed?

Yes.

3. FAA Sec. 611(b); App. Sec. 101. If the loan or grant is for a water or related land-resources construction project or program, do plans include a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility?

Not applicable.

4. FAA Sec. 611(e). If this is a Capital Assistance Project with U.S. financing in excess of \$1 million, has the principal A.I.D. officer in the country certified as to the country's capability effectively to maintain and utilize the project?

Yes. See annexes.

B. Relation to Achievement of Country and Regional Goals

-- Country Goals

1. FAA Secs. 207, 281(a). Describe this loan's relation to:
- (a) Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development.
 - (b) Enabling the country to meet its food needs, both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity.
 - (c) Meeting increasing need for trained manpower.
 - (d) Developing programs to meet public health needs.
 - (e) Assisting other important economic, political, and social development activities, including industrial development; growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development; and modernization of existing laws.

The loan will be consistent with these objectives and is related to an emphasis on self-help in meeting India's food needs. The project should improve the availability of trained manpower and assist development of Indian cooperatives.

2. FAA Sec. 201(b)(4). Describe the activity's consistency with and relationship to other development activities, and its contribution to realizable long-range objectives.

The project is closely related with India's other developmental activities and should make a demonstrable contribution to realizable long-range objectives.

3. FAA Sec. 201(b)(9). How will the activity to be financed contribute to the achievement of self-sustaining growth?

The project will contribute to the achievement of self-sustaining growth. See Sections II and IV of CAP AID-DLC/P-851.

4. FAA Sec. 201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development.

See Section II, IV and V, l.c.

5. FAA Sec. 201(b)(3). In what ways does the activity give reasonable promise of contributing to development of economic resources, or to increase of productive capacities?

The project should do both. See Sections II, III, IV and V, l.c.

6. FAA Sec.281(b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes.

The loan will not make a direct contribution. The project is an essential part of the program to enable free people to feed themselves at an adequate level, which is necessary for healthy democratic private and local government institutions.

7. FAA Sec.601(a). How will this loan encourage the country's efforts to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions?

(a) Trade would take place between the U.S. and India since all purchases financed from the loan would have their source and origin in the U.S. and be shipped from the U.S.

(b) The loan funds will be used by a private sector Indian cooperative, and purchases will be made from private U.S. firms.

(c) The loans would not necessarily have any direct effect on the development and use of credit unions and savings and loan associations. However, development and use of cooperatives will be encouraged since they will own the project.

(d) The loan will help to discourage monopolistic practices by providing further competition in India's domestic fertilizer industry.

(e) The loan will improve the efficiency of industry, agriculture and commerce as discussed in II, III and V, l.c.

(f) The loan might assist free labor unions by fostering economic development and assisting in the reduction of unemployment.

8. FAA Sec.202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to intermediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources.

The loan funds would be used by the private cooperative sector in India, and purchases would be made from private U.S. firms thru normal commercial channels.

9. FAA Sec. 611(a)(2). What legislative action is required within the recipient country? What is the basis for a reasonable anticipation that such action will be completed in time to permit orderly accomplishment of purposes of loan?

No legislative action is required of India to accomplish the purpose of this loan.

-- Regional Goals

1. FAA Sec. 619. If this loan is assisting a newly independent country, to what extent do the circumstances permit such assistance to be furnished through multilateral organizations or plans?

India is not a newly independent country. Assistance to India from the developed countries of the Free World is coordinated through a consortium.

2. FAA Sec. 209. If this loan is directed at a problem or an opportunity that is regional in nature, how does assistance under this loan encourage a regional development program? What multilateral assistance is presently being furnished to the country?

This loan is not for a regional development program. Assistance to India is coordinated through a consortium of the free world developed countries.

C. Relation to U.S. Economy

-- Employment, Balance of Payments, Private Enterprise

1. FAA Secs. 201(b)(6); 102, Fifth. What are the possible effects of this loan on U.S. economy, with special reference to areas of substantial labor surplus? Describe the extent to which assistance is constituted of U.S. commodities and services, furnished in a manner consistent with improving the U.S. balance of payments position.

All purchases financed from the loan would have their source and origin in the U.S. Areas of substantial labor surplus in the U.S. may benefit.

2. FAA Secs. 612(b)(d), 636(h). What steps have been taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. and local currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign-owned currencies are utilized in lieu of dollars?

India is satisfying these sections.

3. FAA Sec. 601(d); App. 109. If this loan is for a capital project, to what extent has the Agency encouraged utilization of engineering and professional services of U.S. firms and their affiliates? If the loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S. If so, has the required waiver been obtained?

The full amount of the loan will be spent for procurement of goods and services from U.S. Private enterprises. Any contracting services by contractors who will not be citizens of either U.S. or India will not be financed under the loan.

4. FAA Sec.608(a). Provide information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.

Borrower is a private institution and therefore is not eligible to use USG excess personal property.

5. FAA Sec.602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan?

The procurement procedures to be followed under this loan are set forth in Section VII, this CAP. The loan agreement will contain appropriate provisions.

6. FAA Sec.621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they particularly suitable; are they competitive with private enterprise (if so, explain); and how can they be made available without undue interference with domestic programs?

Loan does not provide technical assistance.

7. FAA Sec.611(c). If this loan involves a contract for construction that obligates in excess of \$100,000, will it be on a competitive basis? If not, are there factors which make it impracticable?

See Section XIII of this CAP.

-- Procurement.

1. FAA Sec.602(a). Will commodity procurement be restricted to U.S. except as otherwise determined by the President?

Yes.

2. FAA Sec.604(b). Will any part of this loan be used for bulk commodity procurement at adjusted prices higher than the market price prevailing in the U.S. at time of purchase?

No bulk commodity procurement is involved.

3. FAA Sec.604(e). Will any part of this loan be used for procurement of any agricultural commodity or product thereof outside the U.S. when the domestic price of such commodity is less than parity?

No.

D. Other Requirements.

1. FAA Sec.201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year?

Yes.

2. App.106. Does the loan agreement provide, with respect to capital projects, for U.S. approval of contract terms and firms?

Yes.

3. FAA Sec.620(k). If the loan is for construction of a productive enterprise, with respect to which the aggregate value of assistance to be furnished will exceed \$100 million, what preparation has been made to obtain the express approval of the Congress?

The aggregate value of assistance to be furnished is less than \$100 million.

4. FAA Sec. 620(b), 620(f). Has the President determined that the country is not dominated or controlled by the international Communist movement? If the country is a Communist country (including, but not limited to, the countries listed in FAA Sec.620(f)) and the loan is intended for economic assistance, have the findings required by FAA Sec.620(f), been made and reported to the Congress?

There is such a determination.

5. FAA Sec.620(h). What steps have been taken to insure that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-Bloc countries?

The assistance will not promote or assist such projects or activities. A provision to this effect will be included in the loan agreement.

6. App. Sec.110. Will any funds be used to finance procurement of iron and steel products for use in Vietnam other than as contemplated by Sec.118?

No.

7. FAA Sec.636(i). Will any part of this loan be used in financing non-U.S.-manufactured automobiles? If so, has the required waiver been obtained?

No.

8. FAA Secs.620(a)(1) and (2), 620(p). Will any assistance be furnished or funds made available to the government of Cuba or the United Arab Republic?

No.

9. FAA Sec.620(g). Will any part of this loan be used to compensate owners for expropriated or nationalized property? If any assistance has been used for such purposes in the past, has appropriate reimbursement been made to the U.S. for sums diverted?

No.

10. FAA Sec.201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise?

Private Indian cooperatives control the corporation which will own the project.

11. App. Sec.104. Does the loan agreement bar any use of funds to pay pensions, etc., for persons who are serving or who have served in the recipient country's armed forces?

No such payments to be financed under the loan.

12. MMA Sec.901.b. Does the loan agreement provide, for compliance with U.S. shipping requirements, that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately owned U.S.-flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S. flag vessels?

Yes.