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

CAPITAL ASSISTANCE PAPER

235p

Proposal and Recommendations
For the Review of the
Development Loan Committee

BANGLADESH - ASHUGANJ FERTILIZER REPORT

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AID-DLC/P-2060

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

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AID-DLC/P-2060

December 10, 1974

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Bangladesh - Ashuganj Fertilizer Report

Attached for your review are recommendations for authorization of a loan to the Peoples' Republic of Bangladesh ("Borrower") in an amount of Thirty Million United States Dollars (\$30,000,000) to assist in financing the foreign exchange costs of goods and services required for site preparation for and construction of a urea fertilizer plant at Ashuganj in Bangladesh ("Project").

This loan proposal is scheduled for consideration by the Development Loan Staff Committee on Thursday, December 19, 1974. Also please note your concurrence or objection is due by close of business on Monday, December 23, 1974. If you are a voting member a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES I - XXX

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ASHUGANJ FERTILIZER PROJECT

AID-DLC/P-2060

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Much of the narrative and analysis in this paper was prepared by the International Development Association. The documents contained in Annexes 27, 28 and 29 resulted from the loan negotiations and were drafted by various parties thereto. The Summary and Recommendations, Sections IX through XII and Annexes 24, 25, 26 and 30 were prepared by A.I.D.

CAPITAL ASSISTANCE PAPER

December 10, 1974

BANGLADESH - ASHUGANJ FERTILIZER REPORT

SUMMARY AND RECOMMENDATIONS

1. Borrower: The Peoples' Republic of Bangladesh (BDG)
2. Beneficiary: The BDG will relend the proceeds of the A.I.D. loan to the Ashuganj Fertilizer and Chemical Company, Ltd. (AFCC), a new company established in Bangladesh under the Companies Act of 1913, but wholly owned by the Government.
3. Loan Amount: \$30.0 Million
4. Loan Terms:
 - To the Government: 40 years, including a 10-year grace period on the repayment of principal with interest at 2% per year during the grace period and 3% per year thereafter.
 - To the Beneficiary: 15 years, including a 5-year grace period on the repayment principal, with interest at 10% per year.
5. Total Project Cost: \$249.4 million, of which \$142.3 (57%) is the estimated foreign exchange cost (to be financed by the A.I.D. and other FX loans). The local currency cost of the project (\$107.1 million equivalent) will be provided by the BDG to AFCC in the form of equity, and shares will be issued to the BDG for this amount.
6. Project: The design and construction of a modern fertilizer facility located 60 km from Dacca, including all necessary offsites. The plant will have an annual capacity of 528,000 tons of urea and 305,000 tons of ammonia.
7. Background: Increased usage of fertilizers is critical in the BDG's efforts to produce more of the food required to feed its growing population. With its severe shortages of foreign exchange, and the scarcity of fertilizer in world markets, it is essential that Bangladesh use its indigenous natural gas resources to produce more of its fertilizer needs. This project will more than double the country's urea production capacity.

8. Export-Import Bank Interest: Exim Bank has indicated it has no interest in the proposed loan.
9. Mission Views: The Mission supports the project and recommends approval of the loan. The Mission Director's certification pursuant to Section 611(e) of the Foreign Assistance Act of 1961, as amended, is attached as Annex 25.
10. Statutory Requirements: All applicable criteria for the A.I.D. loan have been met. See Annex 30.
11. Recommendations: That a loan to the BDG in the amount of \$30.0 million be authorized for the purpose and on the terms and under the conditions set forth in the draft loan authorization included as Annex 26.

PROJECT COMMITTEE:

Chairman -	Robert N. Bakley, NESAs/CD
Loan Officer -	William F. McDonald, NESAs/CD
Legal Advisor -	W. Bruce Gair, GC/NESA
Contract Advisor -	Barry S. Knauf, CM/SD/REV
Engineering Advisor -	James Cooperman, ENGR/OPNS/TR
Agricultural Advisor -	John Balis, NESAs/TECH
Desk Officer -	Robert W. Beckman, NESAs/SA

Definitions of Rates, Weights and Terms

Currency

U.S. Dollar \$1.00 = Takas 7.5

Weights

Metric Ton (MT) = 2,204.6 pounds (all weights in this paper are Metric Tons)

Accronyms

Ashuganj Fertilizer and Chemical Company, Ltd. = AFCC
Tennessee Valley Authority = TVA
Government of Bangladesh = BDG
Bangladesh Agricultural Development Corporation = BADC
Bangladesh Fertilizer Chemical and Pharmaceutical Corp. = BFCPC
Bangladesh First Five-Year Plan (1973-1978) = FYP
Thana Central Cooperative Associations = TCCA's
Metric Tons Per Year = MPY = TPY

Fertilizers

Triple Super Phosphate (0-46-0) = TSP
Diammoniom Phosphate (18-46-0) = DAP
Muriate of Potash = MP
Nitrogen = N
Phosphorous Pentoxide = P₂O₅
Potassium Oxide = K₂O
Complex fertilizers containing Nitrogen, Phosphorous and Potassium = N-P-K

Rice Seasons

The aus season (about one-third of the total paddy acreage) takes advantage of the scattered spring rains; the crop may suffer from drought in some areas, especially during the early part of the season. There may be serious weed problems. The aus crop is harvested during the monsoon; drying and storage is therefore difficult. Aus seeding is done between 15 March and 15 May (broadcast); or seedlings may be transplanted between 1 March and 15 April. The crop is harvested between mid-July and mid-September.

The aman season (nearly 60% of the total paddy acreage) uses the heavy monsoon rains; wide areas may have water up to 15 or 20 feet deep. If the rice seed is broadcast, the yield is poor, but only broadcast sowing is possible in deep water. Transplanted aman is the major rice crop accounting for about 65% of the total aman area. Seedlings are raised in nurseries in June-July and

transplanted to puddled fields in July-September; or seeds are broadcast between mid-March and the end of April. The aman crop is harvested between mid-November and mid-January.

The boro (winter) crop has dry weather during its growth period and temperatures are low. Its acreage is limited to low-lying areas where flood water is receding and growth can be sustained by residual soil moisture--or by some form of irrigation (traditional, low-lift pump, tubewell or gravity diversion). Seeds are planted from September on, or seedlings transplanted between November and February; the crop is harvested between the end of March and May.

December 10, 1974

I. INTRODUCTION

1. The Government of Bangladesh (BDG) has requested an A.I.D. loan of \$30 million for an ammonia-urea fertilizer project estimated to cost \$249.4 million, including \$142.3 million in foreign exchange. The balance of the project's foreign exchange requirements will come from the following sources: International Development Association (IDA), \$33.4 million^{1/}; the Asian Development Bank (ADB), \$30 million; the United Kingdom, through the Ministry of Overseas Development (ODM), \$18.0 million; the Government of Iran, \$12.4 million; the Federal Republic of Germany (FRG), \$12.0 million; and the Government of Switzerland, \$6.5 million. The Government of Bangladesh will provide the required local currency cost from its own resources. All foreign exchange loans will be made to the Government at concessional terms.

2. The proceeds from the foreign borrowing will be relent by the Government to the Ashuganj Fertilizer and Chemical Company (AFCC), a new company established to build and operate the fertilizer plant. The project, with a rated capacity of 528,000 tons per year (TPY) of urea, or about 243,000 TPY of Nitrogen (N) will increase the country's urea manufacturing capacity to about 950,000 TPY. The plant will be built at Ashuganj, on the bank of the Meghna River, in the district of Comilla, about 60 km northeast of Dacca, with rail and water transport connections to all important agricultural areas of the country. It will use natural gas from the nearby Titas gasfield as feedstock and fuel.

3. The origin of the project dates back to early 1970, when the then East Pakistan Industrial Development Corporation (EPIDC) presented to IDA a project consisting of a 320,000 TPY urea plant at the same location as part of a large petrochemical complex to be based on the same natural gas resources. After the war of independence; the Government of Bangladesh requested that IDA review a revised project prepared by the newly formed Bangladesh Fertilizer Chemical and Pharmaceutical Corporation (BFCPC) which had taken over EPIDC's role in fertilizer and other chemical industries. During the IDA project preparation missions in February, July and October 1973, the present project was developed; and in September 1973, the Government sought IDA assistance in securing the necessary foreign exchange financing.

^{1/} This includes \$0.4 million in the form of an existing IDA Technical Assistance Grant. The IDA loan will be for \$33.0 million.

II. THE AGRICULTURAL SECTOR IN BANGLADESH

A. The Role of the Sector

1. The importance of agriculture in the Bangladesh economy extends beyond its contribution of more than 55% to gross domestic product and its provision of livelihood to over 75% of the total labor force, for there are important areas of interaction between agriculture and the rest of the economy which are crucial to the pace and direction of economic development in Bangladesh. First and most obviously, the agricultural sector is a primary determinant of foreign exchange availability. Between 1969/70^{1/} and 1972/73, exports of raw jute and jute goods, dependent entirely on the size and quality of the jute crop, earned between 75% and 87% of Bangladesh's foreign exchange. Many minor exports such as tea, fish, spices, leather, hides and skins also arose from the agricultural sector. Together these minor agro-based exports earned some 9% of Bangladesh's foreign exchange in 1972/73. The size of the rice crop determines the need for foodgrain imports, which in 1969/70--the last "normal" year before independence--constituted nearly 20% of total imports. Second, the largest component of Bangladesh's industrial sector, jute textiles, depends directly on raw material from the agricultural sector. Third, the agricultural sector can be an important market for goods and services from other sectors. As agriculture modernizes, demands for locally produced inputs (such as fertilizers), equipment (such as pumps and tubewell materials), services (trade and transport), agriculturally based processing industries, and basic consumer goods and services are likely to accelerate, with effects in both urban and rural areas. Fourth, by providing sufficient food at a low enough price, agriculture can help keep demands for wage increases down, thereby increasing the relative profitability of other sectors and dampening urban political pressures for cheap food. In short, growth in agriculture can have a stimulating impact on growth in all other sectors of the economy.

2. If agriculture dominates the national economy, it overwhelms the rural economy. About 80% of the rural labor force is directly engaged in agriculture. It is not possible to determine with any precision what portion of total rural income is directly attributable to agriculture, but one very crude estimate is about 70%. But these numbers naturally understate the importance of agriculture, for most of the other rural activities--trade, processing, construction, and the like--depend almost directly upon agriculture. Indeed the variations in the agricultural seasons determine the very pace of rural life, from the bustle of the marketplace when jute and paddy

^{1/} All years in this paper refer either to the Bangladesh fiscal year (i.e., 1969/70) or to the calendar year (i.e., 1970).

crops are harvested, to the long dry spell, for most farmers, between the harvesting of the late summer (aman) crop and the harvesting of the summer (aus) crop. During the peak seasons, it is common for those normally or partially employed in other occupations to supplement their income by work in the fields. Progress in the agricultural sector is thus likely to have beneficial repercussions on the rest of the rural economy.

3. During the 1950's and 1960's, however, the agricultural sector in Bangladesh was not able to provide enough food for its growing population, let alone take a leading role in the economy. While policymakers gave increasing rhetorical emphasis to the importance of agriculture, the sector as a whole grew by only about 2.0% per year, causing foodgrain imports to grow from less than 200,000 tons in 1955/56 to over 1.5 million tons by 1969/70. One study^{1/} found that real per capita rural incomes fell during this period from Rs. 275 in the early 1950's to Rs. 268 in the early 1960's. Over the same period the study shows urban incomes growing from Rs. 619 to Rs. 677. Severe drought, combined with interruption of the agricultural development programs during the struggle for independence, left agricultural output in 1972/73 about 20% lower than 1969/70 levels.

4. Planning for the development of agriculture in Bangladesh is an enormously difficult task, made more so by the complexity of the country's physical environment and socio-economic structure. Although soil structure is good and temperatures allow year-round cropping, agricultural development is constrained by a number of factors:

- (i) Possibilities for further expanding the cultivable area of 22.5 million acres are limited; therefore, gains in agricultural production will require more intensive land use and higher yields.
- (ii) About 2.5 million acres are deeply flooded and cultivation of such land is possible only after the flood subsides in November; and a further 5.5 million acres which are annually flooded from 3 to 15 ft. are suitable for cultivation of only one crop of floating rice.
- (iii) During the dry season from November to March, irrigation is essential for foodgrain production.
- (iv) Abnormal floods, droughts and cyclonic storms occur from time to time and hamper agricultural production.

^{1/} Bose, S. R., p. 478, "Trend of Real Income of the Rural Poor in East Pakistan, 1949-66".

- (v) With a population density of over 2,000 per square mile of cultivated land, farms are very small and fragmented (less than three acres on the average) and agriculture is characterized largely by subsistence farming.

5. Although very poor, the farmers of Bangladesh have demonstrated considerable skills over the years. Their development of complex cropping patterns suited to the difficult environmental conditions, their rapid adoption of high-yielding varieties, their responsiveness to prices, and their very survival on few resources, all point to adaptive, innovative and industrious characteristics. The Plan¹ set forth a strategy intended to build on these characteristics by providing the farmers with new crop varieties and inputs which will both increase output and labor use. Fortunately, much of the technology for implementing this strategy has already been developed and had begun to be introduced before the Plan began.

B. Implications for Agricultural Development Strategy

6. From the foregoing it can be seen that the development of the agricultural sector is vital to the economy of Bangladesh. However, the potential for such development is seriously constrained by lack of additional land and by the necessarily slow pace of irrigation development due to the large capital resources that are required. Yet Bangladesh's needs for agricultural output are growing constantly. The inability of agricultural production to keep pace with population was dramatically demonstrated by the growth in foodgrain imports from about 500,000 tons in the early 1960's to 1.5 million tons by 1969/70 and 2.8 million tons by 1972/73. Faced with these growing problems, the major focus of Bangladesh's agricultural strategy includes a more intensive agriculture with greater yields and higher cropping intensities.

7. Crucial to such a strategy over the next five or ten years will be the increased use of seeds of new varieties and fertilizers. Some seed varieties mature in less time, making multiple cropping more feasible. Certain high-yielding varieties are in widespread use during certain seasons: IR-8 is grown on 45% of the boro acreage and IR-20 is grown on about 17% of the transplanted aman acreage. As new varieties more carefully adapted to the particular ecological conditions of Bangladesh are evolved, the usage will spread. There are reports of improved varieties suitable for large areas of the aus crop and of new varieties better suited for some aman areas than IR-20.

8. The fairly rapid adoption of these new varieties has been accompanied by an increase in demand for complementary inputs, particularly fertilizer. The speed with which the new seed-

¹ / The First Five-Year Plan (1972/74-1977/78).

fertilizer technology has been adopted suggests that this is a technology which the small farmers of Bangladesh can readily utilize. In part, the suitability of this technology arises from its divisible nature--farmers can adjust the amount of seed and fertilizer they use to the size of their holding, to their ability to pay or to the availability of the inputs.

III. FERTILIZER DEMAND, MARKETING AND DISTRIBUTION

1. Fertilizer use in Bangladesh has grown rapidly. Annex 1 provides historical consumption and supply data as well as a comparison of fertilizer use in Bangladesh with that in other countries, and Annex 2 describes the present system for marketing and distribution of fertilizers. The following paragraphs summarize the major findings of these Annexes.

A. Past Fertilizer Use

2. The following table shows the past trend of fertilizer consumption, local supply and imports in Bangladesh since 1963/64.

Past Fertilizer Consumption, Production and Imports
(in 1,000 tons of nutrients)

	N			P2O5	K2O	Total	
	<u>Consump- tion</u>	<u>Produc- tion^{b/}</u>	<u>Apparent Imports^{c/}</u>	<u>Consump- tion (All Imports)</u>	<u>Consump- tion (All Imports)</u>	<u>Consump- tion</u>	<u>Production as % of Consumption</u>
1963/64	34.5	24.5	10.0	10.9	2.5	47.9	51.1
1964/65	32.7	31.3	1.4	8.8	2.0	43.5	71.9
1965/66	38.3	45.4	-7.1	9.4	2.3	50.0	90.8
1966/67	55.6	37.4	18.2	15.9	5.0	76.5	48.9
1967/68	70.0	56.2	13.8	22.1	6.5	98.6	57.0
1968/69	73.6	37.4	11.1	24.3	7.4	105.3	35.3
1969/70	90.3	44.5	45.8	30.3	9.2	129.8	34.3
1970/71	97.7	39.8	57.9	34.8	10.7	143.2	27.8
1971/72	78.1	25.8	52.3	27.6	8.3	114.0	22.6
1972/73	125.1	85.9	39.2	40.6	10.9	176.4	48.7

^{a/} Excludes Ammonium Sulphate (A.S.) used primarily by tea estates.

^{b/} Purchases from local factories.

^{c/} Includes stock adjustments.

The above table indicates the rapid growth in fertilizer use in Bangladesh increasing from 47,900 nutrient tons in 1963/64 to 143,200 tons in 1970/71, or by about 17% per year. The 1971 war led to disruption of both local production and imports causing consumption to drop significantly, but in 1972/73 local production and consumption picked up sharply despite the worldwide scarcity and significant rise in the local price. While the sharp increase in local production of urea in 1972/73 allowed a major reduction in import dependence, overall nutrient imports in that year still accounted for more than half of consumption, and total available

nitrogen production capacity in Bangladesh was only utilized at about 45%. With the exception of relatively small amounts of ammonium sulphate, local production is in the form of urea. The table also shows that production of nitrogen fertilizer has been rather erratic.

3. The rapid recovery of fertilizer consumption in 1972/73-- which occurred in spite of the disruptions caused by the war, a severe drought and the overall poverty of the farmers--indicates the strength and resilience of fertilizer demand. High and rising prices for rice and the spread of high-yielding, fertilizer-responsive rice crops have contributed to the growth of fertilizer demand, which was particularly strong in such progressive agricultural areas as Chittagong, Comilla, Dacca, and Kishorganj where the use of these varieties has spread most rapidly. Urea is particularly suitable for application on high-yielding rice varieties, not only for agronomical reasons but also on account of its high analysis and the resulting lower transport costs.

4. Although the farmers in Bangladesh are increasingly aware of the advantages of fertilizers and the progressive ones have augmented their use dramatically, they still use only about 19 kg. of nutrient per hectare of arable land. This dosage is on a par with other countries in the sub-continent, but is not only very low considering the cropping intensity, water availability and the levels of fertilizer use which would provide optimal yields, but also represents a mere 28% of the world average. It appears that neither the lack of adequate agricultural credit institutions nor the small size of farms have prevented fertilizer demand from growing even faster but that inadequacy of supply has been the major constraining factor, particularly in recent years. Thus, while official prices of fertilizer at farm level have more than doubled (for urea from Tk. 536 (\$71.5) per ton in 1972/73 to Tk. 804 (\$107) in July 1973 to Tk. 1,341 (\$179) in April 1974), there were widespread reports of a fertilizer black market in 1973 charging two to three times the official price. Also a nationwide agricultural survey in 1967/68 indicated that farmers with less than 2.5 acres used 35% more fertilizer per acre than did farmers with larger farms. While up to date figures are not available, indications are that this is still so today.

B. Forecast of Fertilizer Demand

5. The growth of fertilizer demand in Bangladesh will both determine, and be determined by, the pace and structure of agricultural development in Bangladesh. The most promising opportunities for increasing agricultural output over the next five to ten years lie in the spread of high-yielding crop varieties and complementary inputs, particularly fertilizer. Detailed fertilizer demand projections through 1982/83 have been prepared based on

present farming practices, probable increases in irrigated land, use of high-yielding varieties on both irrigated and rainfed areas, expected pricing policy (for agricultural inputs and crops), and improvement in marketing and distribution during the forecast period. The details and underlying assumptions are given in Annex 1 and are summarized below for urea, together with projections of local production. Since all such projections depend on a wide range of interdependent assumptions, the figures should be treated more as an indication of the probable orders of magnitude involved rather than precise predictions.

Bangladesh--Projected Urea Demand
(in 1,000 tons of product)

	<u>Demand</u>	<u>Production</u>	<u>Implied Exports (+) Imports (-) and/or Stock Changes</u>
1974/75	367	40	- 327
1975/76	428	352	- 76
1976/77	499	352	- 147
1977/78	583	475	- 108
1978/79	630	738	+ 108
1979/80	682	791	+ 109
1980/81	738	827	+ 89
1981/82	799	827	+ 28
1982/83	866	827	- 39

6. The projections show demand for urea growing at an average of about 12.3% a year from 1972/73, as compared with an actual annual consumption growth of 15.4% over the past ten years. Accounting for shutdowns of the two existing urea plants for repairs and extensive overhauling in 1974/75, and assuming 80% capacity utilization of these plants in subsequent years, local demand will exceed local production until 1978/79, the second year of production for the proposed Ashuganj plant (the Project). There will then be about four years of modest surplus production before demand again would exceed local supply, assuming that the project operates at 90% of installed capacity from 1980/81 onward.

7. No difficulty is expected in disposing of any such modest temporary surplus on the world market. Since natural gas is now substantially cheaper than other feedstocks for the production of nitrogen fertilizer, Bangladesh should be able to export urea at prices both competitive and profitable. India would be the most likely export market, given Bangladesh's proximity and given the projected gap in India between local nitrogen fertilizer production and demand. The Government of India and Bangladesh are discussing plans to establish jointly an ammonia/urea plant of

similar capacity, whose surplus output would be sold to India. However, even assuming that that project would proceed without delay, India's gap between supply and demand is expected to exceed one million tons of urea in 1980, so that there should be no problem of disposing of whatever surplus urea Bangladesh can make available in India alone.

C. Marketing, Fertilizer Pricing and Distribution

8. Annex 2 describes in detail the system of marketing and distribution of fertilizers, fertilizer pricing policy and the related subject of sales promotion, extension services and credit. The Bangladesh Agricultural Development Corporation (BADC), a public sector corporation responsible to the Ministry of Agriculture procures (either locally or by import) and distributes nearly all fertilizer used in Bangladesh down to the Thana (county) level. There fertilizer is purchased either by one of the 29,000 private licensed retail dealers or, in the case of 62 of the 413 Thanas, by the Thana Central Cooperative Association (TCCA), which acts as a wholesale agent and resells the fertilizer either to its member village cooperatives or to private retail agents.

9. Considering the inherent difficulties of transportation in Bangladesh, this fertilizer distribution system has proven flexible enough to handle the substantial expansion in fertilizer use over the last decade. It has also, through the vast network of small dealers, brought fertilizer to within the reach of virtually every farmer in Bangladesh. The dealers as a matter of course sell fertilizer in minute quantities--often only a few kilograms at a time--so that a farmer can buy the precise amount he wants and can afford. This is an important advantage in a land of small farmers.

10. During the past few years, however, due to the rapid increase in volume, price distortions, disruption of the transportation system and severe general fertilizer shortages, the system has shown faults and attracted increasing criticism. Many factors are involved in this. The difference between the Indian and Bangladesh fertilizer prices--Indian prices are considerably higher--has provided a strong incentive for smuggling and an active black market in fertilizer has emerged. There also appear to be weak links within the distribution system itself. As a consequence of all these factors, farmers frequently complain that fertilizers are not available to the extent and when they want them.

11. These problems, combined with the need to develop a system capable of distributing much greater quantities of fertilizer in the future, have led the Government to undertake a comprehensive fertilizer marketing and distribution study. The main objective of the study is to propose institutional, organizational and

policy changes and improvements and to identify investment needs in fertilizer distribution and marketing. The first phase of this study, carried out with technical assistance from TVA and financed by A.I.D. began in April 1974 and was formulated in consultation with IDA. Its terms of reference are contained in Annex 3. Efforts are now underway to prepare detailed terms of reference for the study's second phase which would in turn produce a feasibility report for distribution and marketing projects, suitable for financing by external donors. Among the tasks of the TVA team were the preparation of detailed area-wide demand projections, analysis of bagging and handling methods, assessment of storage needs, as well as review of transportation requirements, making use of the nearly completed Bangladesh Transport Survey undertaken with assistance from the UK Government.

12. As described in Annex 2, for years fertilizers have been sold to farmers at heavily subsidized prices, primarily to promote their use. The Plan recognizes that farmers are now aware of the advantages of fertilizer and that demand for fertilizer is strong, and addresses the Government's financial resource situation. As a result of reports that the larger farmers benefitted more from the subsidies than smaller farmers, the Plan called for a phased reduction in subsidies. The soaring costs of imported fertilizer following publication of the Plan added another dimension to the problem and prompted the Government to raise fertilizer prices sharply. The present pricing structure no longer subsidizes the sale of locally produced urea. Prices of imported fertilizers, on the other hand, are still subsidized in varying degrees, but the subsidy is likely to be eliminated or substantially reduced as world market prices for fertilizer return to more normal levels after the next several years and as the Government continues to carry out its policy of a phased reduction of subsidies. A.I.D. and other donors have communicated our belief to the BDG that reduction of the subsidies on agricultural imports should be implemented as rapidly as possible.

13. As fertilizer supplies come into better balance with demand, the present sellers' market situation is likely to change. In addition, as farmers move somewhat closer to optimal fertilizer dosages, they will require more accurate information on fertilizer use and its effect on various crops. This would suggest an increasingly important role for extension and demonstration activities in the future. These activities (Annex 2) are now inadequate; and the Government, together with an FAO/IBRD cooperative program team, is working on the preparation of a Rural Development Education and Training Project, for possible financing by IDA, which could constitute an important first step in the long range improvement of extension and farmer training.

14. An effective system of agricultural credit, capable of providing farmers with timely finance on reasonable terms, could ease the financial burden to farmers of increasingly intensive fertilizer use. Unfortunately, the agricultural credit institutions now suffer from serious weaknesses and efforts to improve them will require careful development and considerable time. The fertilizer demand projections above took into consideration the limitations of the existing credit system, and lack of farmer credit is, therefore, not expected to constrain demand below projected levels. Government credit now plays a very limited role in fertilizer purchases since only about 15% of farmers' borrowings come from government sources. Moreover, only a small part of a farmer's borrowings is used for purchasing fertilizer and only a fraction of all fertilizer sales are financed by credit. Limited reliance on existing credit sources, combined with growing use of high-yielding varieties and continued profitable rice prices, should enable demand to expand at the rate projected.

IV. THE COMPANY

A. Background: The Bangladesh Fertilizer Industry

1. Chemical fertilizer has been used in Bangladesh since 1955 and demand has been growing at about 15% annually over the past ten years. In 1961, to meet these growing requirements, EPIDC completed a 106,000 TPY urea plant at Fenchuganj and in 1970 another 340,000 TPY urea plant at Ghorasal based on the latest centrifugal compressor technology. Both plants use the country's ample reserves of high pressure, low sulphur natural gas. While the Fenchuganj plant operated satisfactorily for the first nine years, restart after the war showed disappointing results and a major overhaul is currently in progress. The Ghorasal plant, after passing performance tests, encountered mechanical problems and only recently achieved 80% of its rated capacity; however, it subsequently suffered an explosion in the control room which has shut it down completely for an estimated 12 months. The cause of the explosion is being investigated amid confusing reports and numerous charges and counter charges. The Japanese general contractor who constructed the plant is at the site, and the UN is providing \$800,000 to finance replacement of equipment.^{1/}

2. To meet growing phosphate fertilizer requirements, EPIDC completed in 1969 and 1970 two TSP plants of 32,000 and 120,000 TPY capacity, respectively, at Chittagong. Both of these plants are based on imported rock phosphate and sulphur, since the country does not have reserves of its own. A description of the past performance of BFCPC's fertilizer enterprises is given in Annex 4. Agreement was reached with the Government during negotiations on further steps required to bring the existing plants to a reasonable level of output as quickly as feasible.^{2/}

3. After the war of independence, BFCPC was established under the Bangladesh Industrial Enterprises (Nationalization) Order of 1972 to "control, supervise and coordinate" enterprises established in these fields by EPIDC. In addition to the fertilizer plants referred to in the two preceding paragraphs, about 48 enterprises, some abandoned by their previous Pakistani owners, have been put under BFCPC's umbrella. A brief description of BFCPC's present status, functions and performance is given in Annex 5.

B. Corporate Structure and Ownership

4. The project will be carried out by the Ashuganj Fertilizer and Chemical Company, Ltd. (AFCC), a new company established on October 16,

^{1/} \$500,000 from the UN Relief Operation has been earmarked and they expect to get the additional \$300,000 from the UN Emergency Fund.

^{2/} See Sections 5.06 and 5.07 of draft Loan Agreement (Annex 24).

1974, under the Companies Act of 1913. Until the new company is adequately staffed and becomes operational, BFCPC will continue to act for it in further project preparation and implementation with a gradual transfer of responsibilities and commitments being anticipated. Once the new company is fully equipped to manage its affairs, BFCPC will restrict itself to the supervisory and coordinating functions assigned to it under the Bangladesh Industrial Enterprises (Nationalization) Order of 1972, exercised through its nominees on the Board of Directors. The Government will be the sole shareholder of AFCC. The authorized share capital will be Tk. 1 billion equivalent to \$134 million. Paid up capital will be represented by BDG contributions to the cost of the project, for which AFCC will issue shares to the Government.

C. Organization and Management

5. The Company is to have a Board of Directors of not less than five and not more than seven members, all of whom will be appointed by the Government. Initially, a five-member board is planned. The Managing Director will be the Chief Executive of the Company. The Government will consult with the lenders on the appointment of the Chairman (already nominated) and the Managing Director. The Articles of Association have been reviewed by all lenders, and the conclusion of the lenders is that they give the Company sufficient authority to manage its affairs and operate the plant in keeping with sound business principles.

6. BFCPC has selected a Technical Advisor, a joint venture group made up of the Scientific Design Company, Ltd. (UK) and James Chemical Engineering (U.S.), and is presently organizing a team to help implement the project. The team will subsequently be transferred to AFCC.

7. Substantial outside assistance will be needed during the early years of operation. Expatriates will have to assume line responsibility under the general direction of AFCC's Board of Directors, to achieve capacity output in the shortest possible time and to maintain it thereafter. During loan negotiations, the scope and role of such management assistance, both during project implementation and initial operations, was discussed with the Government and funds have been included in the cost estimates to finance such assistance (see Section IX B).

V. THE PROJECT

A. Project Scope

1. The project will be located at Ashuganj, some 60 km northeast of Dacca, and will consist of a 1,600 ton per day (TPD) urea plant with an intermediate ammonia production plant of 925 TPD, along with all necessary ancillary facilities. The ammonia plant will be a single train unit and, assuming future bids prove this to be the most economic design, the urea plant will also be single train. On the basis of 330 days per year on-stream time, the plant will have annual capacities of approximately 528,000 tons of urea and 305,000 tons of ammonia. These are standard size capacities and the project will employ modern commercially proven technology to ensure efficient operation. The reasons for choosing this particular plant size are discussed in Annex 6, and the production processes selected and the plant facilities provided are described in Annex 7 and Annex 8. The site area is about 130 acres, of which 65 acres will be occupied by the plant, leaving another 65 acres for a housing compound for the employees and common facilities. The site is on the eastern bank of the Meghna River and has good rail and waterway connections. The town of Bhairab and the Ashuganj power station are nearby.

B. Raw Materials and Utilities

2. The principal raw material will be natural gas supplied from the existing Titas gasfield, some 12 km from the project site. The Bangladesh Shell Oil Company, Ltd., which is 25% owned by the Government, operates the field and has determined the total reserves at about 63 billion cubic meters. Details of the gas reserves for the major gasfields in Bangladesh, including Titas, and gas analyses are given in Annex 9. Since the gas contains some 97% methane with negligible amounts of sulphur, it is especially suitable for ammonia production. The gas offtake projections for the Titas gasfield are shown in Annex 9. Even assuming that gas demand would continue to increase at about 11% per year for the remainder of the decade, the Titas gas reserves would last for more than another 30 years.

3. An existing high pressure gas transmission line operated by the Titas Gas Transmission and Distribution Company, Ltd., a wholly Government owned entity, passes within about 2 km of the project site and presently has an unused capacity of some 2.6 million M³/D or more than double the project's requirements. Assurances have been received from the Government that a satisfactory quantity of gas (approximately 8,000 million M³) from the Titas gasfield will be allocated to the project, and that a branch line from the existing transmission main to serve the project

will be constructed in time to meet the project's requirements. The Ashuganj Fertilizer and Chemical Company (AFCC) must negotiate and execute a long-term gas supply contract with the transmission company, satisfactory to the lenders, as a condition precedent to A.I.D. making any disbursements.

4. The nearby Ashuganj power station operated by the Power Development Board (PDB) has adequate capacity to serve the project; however, a study is now being made by AFCC's Technical Advisors to determine whether greater reliability and improved economies may be achieved by including captive power generation facilities in the project. In the meantime, provision has been made in the project cost estimates for inclusion of such facilities. In the event that a captive power plant is not included in the project, the AFCC will enter into a contract, satisfactory to the lenders, with the PDB for the supply of power. A covenant insuring this arrangement is contained in the draft Loan Agreement. Water for industrial and drinking purposes will be obtained from the Meghna River. The supply of all utilities is thus reasonably assured.

C. Employment, Training and Operational Assistance

5. The project will provide employment for about 1,200 persons. Of these, some 525 will be key technical, maintenance and operational personnel distributed among ammonia production (116), urea production (112), maintenance department (260), and laboratory (37). This complement of key personnel will be developed during the project's construction period by drawing suitable individuals from within the BFCCPC enterprises, particularly the four existing fertilizer works, and training them to the specific requirements of the project. The training programs will be devised by AFCC and the Technical Advisor in close cooperation with the General Contractor of the project and will include intensive training abroad for selected staff in projects of a similar type. It will be the responsibility of the General Contractor to make the necessary arrangements for this foreign training. Additionally, management assistance will be provided to AFCC to supervise the operation of the project for the first two to three years, and to assist in general administration and financial control of the Company. The general list of the various types of assistance deemed necessary is shown in Annex 11, and funds have been provided in the project cost estimate to cover this.

D. Ecology

6. There are presently no statutory regulations in Bangladesh for industrial effluents. The project will be designed in accordance with European and U.S. standards in respect to solid, liquid and

gaseous emissions. As the natural gas from the Titas gasfield to be used as raw material and fuel is virtually sulphur-free, atmospheric pollution problems are expected to be minimal. Liquid effluent from the plant will be treated in waste water treatment units prior to discharge into the Meghna River, and, under these circumstances, the adverse effect of the project on the environment is expected to be negligible. Pollution control facilities constituting about 2% of project costs are considered satisfactory. See Annex 31 for further details.

E. Project Execution

7. The groups responsible for project execution will be (a) the Company (AFCC), which will be the Owner and executing authority; (b) the Technical Advisor, already selected (Section IV, para. 6), who will act as consultant to the Owner throughout the course of the project from preparation of specifications and tender documents to final acceptance of the complete plant; and (c) the General Contractor, who will contract with the Owner for the supply of the complete plant. The initial services of the Technical Advisor up to the date the IDA credit becomes effective is being financed by a \$4.0 million IDA Technical Assistance Credit which was approved on June 28, 1973. Four hundred thousand dollars (\$400,000) has been appropriated to cover this period. There is no plan for refinancing of this amount upon approval of the project credit.

8. The General Contractor will have full responsibility for implementing the project, including the provision of process licenses, basic and detailed engineering and the management of procurement, construction, start-up and commissioning, and assistance with initial operation. Invitations to bid for the general contract will be issued late this year or early CY 75 to a number of firms which have been prequalified. No U.S. firms are interested in bidding on this contract. Bids are being sought on a fixed price basis for provision of process licenses and all services stated above, with all equipment and materials and construction costs being reimbursable at cost. Equipment and materials procurement will be conducted from the General Contractor's offices with participation by the Owner and his Technical Advisor. The project completion date is scheduled for the end of August 1978, as shown in Annex 12.^{1/}

9. Detailed civil engineering design will be undertaken by the General Contractor and civil construction by local sub-contractors or by local labor directly hired by the General Contractor, who will

^{1/} To meet that date, the Government has agreed to provide foreign exchange necessary to commence site preparation works in advance of the effective dates of the loans. BFCPC has contracted with a U.S. firm for that work. The contract has been reviewed by A.I.D. and, subject to certain changes required by A.I.D., will be eligible for financing under the proposed A.I.D. loan.

supervise the works in either case. Plant erection will be undertaken mainly by local labor directly hired by the General Contractor supplemented by expatriate tradesmen as required. AFCC will form a project team to oversee the works, but this team in the initial stages will be largely guided by the Technical Advisor until it gains the necessary experience and is strengthened by the addition of expatriates who will subsequently assist with plant operation.

VI. CAPITAL COSTS AND FINANCING PLAN

A. Capital Costs

1. The total project cost is estimated at \$249.4 million including \$142.3 million in foreign exchange costs of which \$0.4 million has already been provided from an IDA Technical Assistance Credit to finance the initial costs of the Technical Advisors. This estimate was prepared jointly by the Technical Advisors and the Lenders' joint appraisal mission and is based on price levels prevailing in October 1974; it takes account of equipment price increases in major supplying countries due to the recent oil price increases and the worldwide inflation and equipment supply shortage. Nine and six-tenths percent (9.6%) of both local and foreign exchange erected plant costs are provided as contingency. In addition, price escalation provided is 32.8% of local cost and 18.1% of foreign exchange costs. Ordering of supplies is expected to commence by the fourth quarter of CY 1975 and be substantially completed by late CY 1976. Import duty at an average rate of 40% has been allowed within the local costs to be financed by the BDG. A summary of the capital costs is shown on the following page.
2. Projections of price escalation in general are very difficult under current conditions and even more so for equipment for the fertilizer and related industries which are expanding rapidly throughout the world. Inability to obtain materials on time, longer delivery periods, or even lack of an adequate response to requests for bids could all lead to higher foreign exchange costs than estimated. However, to try to provide a reserve against all conceivable levels of price increases would be counter-productive because such provision, which may prove to be unnecessary, could lead to a loss of resources for Bangladesh, given the limited annual allocation of concessional financing by all lenders, and might discourage tight cost control. Consequently, while the foregoing project cost estimates are considered realistic and are well in excess of previous estimates for similar projects, the possibility of a cost overrun and the need for additional financing, though small, cannot be ruled out altogether (see Section IX D).
3. The initial working capital requirements in addition to the spare parts and catalysts included in the equipment cost estimate are estimated at Tk 96 million (₹12.8 million) with a foreign exchange component of Tk 14.3 million (\$1.9 million) as shown in Annex 13. The foreign exchange component is included in the foreign financing package, while the local currency component will be provided by the Government as part of its equity contribution (as shown in the financing plan) from its own resources.

SUMMARY OF CAPITAL COSTS
(in millions)

	Bangladesh Taka			U.S. Dollars			2 of Base Cost Estimate
	Local	Foreign ^{1/}	Total	Local ^{1/}	Foreign	Total	
Land Acquisition	3	0	3	0.4	0	0.4	0.2
Site Preparation	16	70	86	2.1	9.4	11.5	6.9
Process Equipment and Spare Parts	0	273	273	0	36.4	36.4	21.7
Auxiliary Service Equipment and Spare Parts	0	62	62	0	8.3	8.3	5.0
Materials Handling Equipment and Spare Parts	0	37	37	0	4.9	4.9	2.9
Construction Equipment	0	40	40	0	5.3	5.3	3.2
Miscellaneous Equipment	0	9	9	0	1.2	1.2	0.7
Buildings and Structures	30	48	78	4.0	6.4	10.4	6.2
Freight, Insurance and Duty	229	46	275	30.5	6.1	36.6	21.8
Construction and Erection Services	52	14	66	6.9	1.9	8.8	5.3
Preoperating Expenses	4	180	184	0.6	24.0	24.6	14.7
Management Assistance		12	37	3.4	1.6	5.0	3.0
Working Capital	54	35	42	1.0	4.6	5.6	3.3
	<u>54</u>	<u>10</u>	<u>64</u>	<u>7.2</u>	<u>1.3</u>	<u>8.5</u>	<u>5.1</u>
Base Cost Estimate (BCE)	420	836	1256	56.1	111.4	167.5	100.0
Physical Contingency (9.6% of BCE)	41	80	121	5.4	10.7	16.1	
Expected Price Increases (21% of BCE and Physical Contingency)	<u>138</u>	<u>152</u>	<u>290</u>	<u>18.4</u>	<u>20.2</u>	<u>38.6</u>	
Total Project Cost	599	1068	1667	79.9	142.3	222.2	
Interest During Construction ^{2/}	<u>204</u>	<u>0</u>	<u>204</u>	<u>27.2</u>	<u>0</u>	<u>27.2</u>	
Total Financing Required	803	1068	1871	107.1	142.3	249.4	
Less IDA Tech. Asst. Credit	<u>0</u>	<u>3</u>	<u>3</u>	<u>0</u>	<u>0.4</u>	<u>0.4</u>	
Net Financing Required	<u>803</u>	<u>1065</u>	<u>1868</u>	<u>107.1</u>	<u>141.9</u>	<u>249.0</u>	

^{1/} The rate of exchange used in this estimate and elsewhere in this report is US\$ 1 = Tk 7.50.
^{2/} Including escalation.

B. Financing Plan

4. The financing plan for the project provides that the Government's equity contribution will cover local expenditures while the foreign loans will cover the foreign currency costs. It is shown below:

Financing Plan
(In Millions)

	In Millions of U.S. Dollars			
	Local	Foreign	Total	% of Total
<u>Debt</u>				
International Dev. Assoc.	-	33.0	33.0	13.2
Asian Development Bank	-	30.0	30.0	12.0
A.I.D.	-	30.0	30.0	12.0
Min. for Overseas Dev. (UK) ^{2/}	-	18.0	18.0	7.2
Government of Iran ^{1/}	-	12.4	12.4	5.0
Fed. Rep. of Germany (KFW) ^{2/}	-	12.0	12.0	4.9
Government of Switzerland ^{2/}	-	6.5	6.5	2.6
Sub-Total		141.9	141.9	56.9
<u>Equity</u>				
Government of Bangladesh	107.1	-	107.1	42.9
<u>Grant</u>				
IDA	-	0.4	0.4	0.2
	107.1	142.3	249.4	100.0

Equity financing of the project will be about 43% and debt financing about 57%, which is an acceptable capitalization. In the event that the ratio of foreign and local costs of the project significantly varies, the Government will be permitted to convert a portion of the IDA loan to equity, or to convert a portion of local currency to debt, as the case may be, but the debt equity ration cannot exceed 60/40.

^{1/} The Government of Iran has advised the IBRD that it agrees in principle, to make up to \$15 million available for the Project. Negotiations by Iran with the BDG, and discussions on procedures with the other lenders, are expected to begin shortly.

^{2/} These loans are denominated in the currencies of the lenders; their dollar equivalents are therefore subject to fluctuation, due to changes in the exchange rates.

5. All foreign loans will be made to the Government on concessional terms for weighted average lengths and interest rates of 39 years and about 1.2% respectively, ^{1/}and will be passed on to the AFCC on commercial terms (presently contemplated to be: a grace period of five years, a repayment period of 10 years with interest charged at 10% per year). See draft Financing Agreement (Annex 27).

C. Procurement and Allocation of FX

6. Approximately 66% of the foreign funds available through loans and grants to the project will be untied; the balance being tied to procurement in the U.S. or Code 941 countries (21%), and the U.K. (13%). To insure the optimum use of these funds, and for ease of loan administration, the foreign exchange financing being provided by the lenders, including AID, will in part be on the basis of "parallel" financing, i.e. specific items or categories of goods or services will be preallocated to a specific lender. Items not so preallocated will be financed by a lender selected after the contract has been awarded.

7. The procedures to be followed in the procurement of the preallocated goods and services will conform to the requirements of the lender financing them. The procedures to be followed in the procurement of the unallocated packages or items will comply with the IDA requirements for international competitive bidding, but also will meet the requirements of the lenders who may eventually finance them. The General Contractor will be required to prepare a detailed description of the procurement procedures which will be followed for the project. These procedures will be subject to the approval of the lenders prior to their implementation.

8. The following subparagraphs describe the preallocated procurement packages assigned to five of the lenders (AID, ADB, IDA, KFW and ODM). Two lenders (IDA and the Swiss Government) are providing untied funds which will be used to finance those contracts which are awarded as a result of international competitive bidding and cannot be financed by other lenders.

^{1/}This calculation does not take into consideration the Iranian credit, since its terms and conditions have yet to be negotiated.

a. Asian Development Bank (ADB): ADB will finance the ammonia plant equipment and, if additional funds remain available, the cost of freight and insurance for this equipment and the necessary catalysts and chemicals. The ADB loan is in an amount up to \$30 million equivalent.

b. Federal Republic of Germany (KFW): KFW will finance the urea plant process equipment. The KFW loan is in the amount of DM 30,000,000, equivalent to \$12 million.

c. Agency for International Development (AID): AID's \$30.0 million loan will be used to finance the procurement of the following items:

i. Ammonia Storage, Refrigeration and Bottling Equipment

ii. Condensate Stripping, Water Treatment and Cooling Tower Equipment

iii. Sewer and Effluent Treatment Equipment

iv. Construction Equipment

v. Boats and Vehicles

vi. Urea Bagging Equipment

vii. Bag Lining Machine

viii. Site Development

The above list of preallocated items is subject to revision based on actual procurement costs. Also, should (against present expectations) the General Contractor be a U.S. firm, AID will finance approximately 50% of that contract; in that case, some of the items on the above list would be deleted, and IDA would finance the remaining portion of the general contract.

d. United Kingdom of Great Britain and Northern Ireland (ODM): ODM loan and grant funds in the amount of £ 8,000,000 (equivalent to \$18 million) will also be used to finance the procurement of a preallocated list of items. If the General Contractor is a U.K. firm ODM will finance approximately 50% of that contract, with IDA financing the remainder; the list of items preallocated to ODM for financing would be reduced accordingly. The ODM funds available to the project consist of 65% loan funds and 35% grant funds.

- e. If the General Contractor is not from the U.S., a Code 941 country or the U.K, then IDA will finance the total contract. The IDA loan is for the equivalent of \$33,000,000.
9. The remainder of the procurement requiring foreign exchange will be conducted on the basis of international competitive bidding in accordance with the World Bank's guidelines. These guidelines deal with the prequalification of potential suppliers, requirements for competition, public opening of bids and other procedures necessary to insure that the procurements are conducted on a basis that is equitable to all parties concerned.
10. The local currency costs of procurement will be financed by the Government of Bangladesh. Procurement will be undertaken under its procedures.
11. All contracts must be approved by the Ashuganj Fertilizer and Chemical Company Limited (AFCC). All contracts exceeding taka 1.0 million (approximately \$133,000 equivalent) must of also be approved by a cabinet subcommittee. The lenders have strongly urged the government to raise the lower limit contracts requiring the Subcommittee's approval to taka 2.0 million (approximately \$267,000 equivalent) in order to expedite purchasing.
12. Lenders will approve contracts for the project in accordance with the following guidelines:
- a. Each lender shall have the opportunity to review and approve the General Contract for the project prior to its award.
 - b. AID will have the right to review and approve the terms of the site development contract prior to accepting it as an item eligible for financing under its loan.
 - c. All other subsidiary contracts, and purchase orders will be submitted to the lender financing the item in the following manner:
 - i. Contracts of \$200,000 equivalent or more: The lender financing the item (preallocated items) or the IDA (unallocated items) will have the opportunity to review and approve the prequalification procedures, the list of prequalified firms and the bid documents prior to their release. After the bids have been received and evaluated the lender proposed for financing the item will be furnished a copy of the bid evaluation and the proposed contract for review and approval prior to the award of the contract.

ii. Contracts between \$200,000 and \$25,000 equivalent: Lender review and approval prior to contract award will not be required in order that this large group of contracts can be processed expeditiously. Subsequent to the contract award copies of the bid documents, bid summary, and the executed contract(s) will be submitted to the appropriate lender for review before financing is arranged. If a contract in this category, which has been submitted to AID for financing, is found to be defective and therefore ineligible for AID financing the contract will then be sent to IDA for their review along with a statement that AID cannot finance the contract. IDA will be responsible for assigning the contract to another lender for financing or, if it is not acceptable to any lender, request rebidding.

iii. Contracts under \$25,000 equivalent: Contracts in this category will not be subject to lender review and approval prior to award. Copies of each contract, as awarded, will be furnished to the lender who will finance the contract. Lenders will have the right to refuse to finance such a contract if it is found to be inconsistent with the lender's requirements.

VII. FINANCIAL ANALYSIS

A. Depreciation, Production Cost and Debt Service

1. Start of commercial operations in August 1978, and a production period of twelve years to June 1990 are used for the purpose of analyzing the project's profitability. The factory is depreciated over twelve years on a straight line basis. Capacity utilization is estimated at 50% during the five months of 1978, 75% during the following year, and 90% thereafter. The production costs are shown in Annex 14 and represent estimated mid-1978 costs which, with the exception of labor and natural gas, are about 30-50% higher than prices prevailing in mid-1974. The cost escalation is based on the assumed annual inflation rates shown in Annex 15. The long term foreign exchange debt is to be relented by the Government to AFCC at 10% annual interest for fifteen years (starting December 1974), including a five-year grace period and to be repaid in equal, semi-annual payments starting January 1, 1980, the start of the third operating year. The final payment would be made July of 1989. Interest on the outstanding balance is also to be paid semi-annually with the first payment on January 1, 1979 to cover interest charges for the three-month period October to December of 1978. ^{1/} The corporate income tax rate is 55%, but operating losses can be carried forward to offset taxable income during subsequent years.

2. The cost structure of the natural gas is described in paras. 4 and 5 of Annex 19. A price of Tk 3.72 (\$0.50) per MSCF is assumed in this analysis. This price is about 60% higher than the late 1974 price and was set by the Government as a basis for the projections and the gas purchase contract between AFCC and the gas transmission company.

3. As of the middle of March 1974, urea fertilizer was priced as follows:

Retail price	\$107 per metric ton
Ex-Factory price	\$103 per metric ton

The distribution cost was subsidized by the Government, hence the spread between the retail price and the ex-factory price was small. Towards the end of March 1974, however, following the Government's policy of a phased reduction in subsidies, retail prices were raised by almost 67% to \$179 per metric ton to eliminate the Government subsidy on urea and also to subsidize the sales of other types of fertilizers, which are still retailed at prices below cost. The ex-factory prices for the existing plants have not been officially increased, but BFCPC has initiated action in this direction.

4. The Government has agreed that the ex-factory price will be set at a level sufficient to provide a minimum debt service coverage of 1.5%. A price of \$155 per ton would be sufficient to satisfy this criterion,

^{1/} The interest during construction shown in Annex 23 was calculated up to September 1978.

and has been used as a basis for the financial analysis. This price is about 45% higher than the present level for domestic production and is conservative, based on the expected prices that the present factories may have to charge in early 1978. Increasing operating costs for chemicals, spare parts, salaries and the scheduled overhaul of the existing factories indicate that 1978 ex-factory prices may be more than \$155 per metric ton. Nonetheless, the social objectives of the Government may dictate keeping the price at about this level.

5. On the assumption that inflation rates for both the ex-factory price and the production costs would be about the same, and the assurances from the Government that the ex-factory prices will be set to meet a minimum debt service coverage of 1.5, all costs and prices are kept at their mid-1978 level throughout the twelve-year forecast period.

B. Financial Forecasts

6. Annex 16 contains the financial statements: Profit and Loss, Cash Flow and Balance Sheets. A loss of \$3 million is anticipated for the initial five operating months in 1978 because of the assumed capacity utilization of 50%. This loss can be avoided if capacity utilization reaches 62%. This relatively high level of production for the beginning of the production period is needed to break even because part of the output, about 43,200 tons representing 8.25% of rated capacity, is used to build up inventory. The initial operating loss is carried forward to offset part of the following year's taxable profit. Net profit is projected to be 11% of gross revenue during the second year and 14% during the fourth year. The percentage then improves by 0.8% during each subsequent year. The debt service coverage ratio is 2.2 initially and improves to 2.7 during the second year. It declines to about 1.5 during the third year as full long-term debt repayments commence. But the ratio gradually improves to 1.6 by the fifth year and 2.0 by the tenth year.

7. The operating cash level is determined by a minimum quick ratio of 1.2 or current ratio of 1.5 for each of the projection years. However, a minimum cash balance of \$1.0 million is retained even if the current or quick ratio test indicates a smaller amount. In the balance sheets included in Annex 16, no dividend payments or additional investments are assumed. Thus, retained earnings are accumulated. Funds in excess of the operating cash requirements are isolated in the balance sheet as either funds available for distribution, representing all the accumulated retained earnings, or as funds available for investment, representing that portion of fixed assets converted into liquid assets through a portion of the depreciation charges. These latter funds can be used for fixed asset investments (e.g., expansion or replacement of equipment) but cannot be paid out as dividends since they are not part of retained earnings. The accumulation of these funds is fairly rapid during the initial four years, starting at \$2.5 million during the first year and reaching a cumulative total of \$24.7 million during the fourth year. There is an additional flow of about \$3.7 million during each subsequent year, up to the eleventh year.

C. Financial Rate of Return and Sensitivity Analysis

8. Capital costs are converted to mid-1978 constant dollars in Annex 15, and the financial cost and benefit streams are shown in Annex 17. Annex 18 contains the financial rates of return for the project under different assumptions. The rate of return is mildly sensitive to project assumptions, with the exception of substantial cost overruns in the 20% region or higher. The base rate of return (after taxes) assuming an ex-factory price of \$155 is 9.2%. The rate of return changes by about 1.1 percentage points for each \$15 per ton change in the ex-factory price.

9. The rate of return (after tax) is low relative to similar projects for the following reasons: (a) conservative assumption about the construction period, about ten months longer than other similar projects; (b) high capital costs due to the price escalations in the capital equipment market, the grassroots nature of the project and the import duties of 40%; (c) conservative assumptions about the ex-factory price; and (d) the high corporate tax rate of 55%.

D. Financial Management and Product Pricing

10. The import, production and distribution of fertilizers to the district level are undertaken by Government enterprises. The pricing of fertilizers at the various levels is also determined by the Government. Since product pricing is the Government's function, while the financial management of the project is the responsibility of the enterprise, it is important that the Government's pricing decisions are consistent with the continued financial viability of the project. It is, therefore, proposed to include the following financial covenants in the Loan Agreement: (a) the debt equity ratio shall not exceed 60:40; (b) the current ratio and the debt service ratio should be at least 1.5:1; (c) dividends shall be paid only out of retained earnings, subject to maintenance of the above ratios; and (d) the Government shall set the ex-factory price at a level sufficient to maintain the debt service coverage ratio of 1.5:1. These clauses have been accepted by the BDG.

11. The financial covenants, while indicating how prices should be set in response to cost changes and liquidity considerations, do not provide directions on how costs can be controlled and how a high production efficiency can be achieved or sustained. The production bonus system partly encourages high capacity utilization, which is imperative, (see Annex 5, paragraph 25). The methods for controlling costs and for obtaining high production efficiencies and the design of an appropriate management system will have to be devised and instituted by the expatriate management assistance team envisioned for this project.

12. Costs can be properly controlled if they are monitored accurately and if there are norms against which the factory's operations can be measured. The norms should preferably be based on efficient operating factories in a competitive environment in both developed and developing countries. To monitor costs accurately, a cost accounting system will have to be instituted. Such a system must have sufficient detail and sufficiently short feedback response to enable management to detect any

adverse development as early as possible. The expatriate assistance in the area of financial management will be expected to establish a system to serve these purposes.

VIII. ECONOMIC ANALYSIS

A. World Fertilizer Prices

1. During the late 1960's, world fertilizer prices were depressed due to excess supply and, consequently, investments in new fertilizer capacity were modest. When demand expanded rapidly during 1970-1973, it was not matched with increased supply and prices have risen sharply, partly due to increases in hydrocarbon and phosphate rock prices, the major raw materials for fertilizer production. Urea fertilizer prices, for example, are now normally in excess of \$200 per ton (f.o.b., bagged) and frequently around \$350 per ton. Freight charges, which also constitute a major portion of imported fertilizer costs, have also increased sharply. The present world-wide fertilizer shortage and high prices, and Bangladesh's continuing foreign exchange shortage, have made it difficult for the country to obtain the imports necessary to meet the growing domestic demand.

B. Economic Analysis

2. The economic analysis is based on 1978 economic operating costs ^{1/} and an assumed price in 1978, c.i.f. Chittagong, of \$175 per ton (bagged). This is roughly composed of an assumed price f.o.b. Persian Gulf or Indonesia of \$145 per ton and freight of \$25 per ton and \$5 per ton for local port handling. No adjustments for inland freight are made since distribution costs from the port of entry and from the plant site are expected to be of the same order of magnitude. Except after transformation to urea, it appears that the natural gas resources of Bangladesh cannot be properly considered an exportable commodity, either directly or indirectly.^{2/} Bangladesh will not import any crude oil or its derivatives to replace the natural gas used for the project. Furthermore, almost all economically and technically feasible substitution of gas for oil has already taken place. Assuming gas consumption grows by 11% annually, present reserves will last in excess of 30 years. Consequently, the shadow price of the natural gas is taken to be the market price. This yields a shadow price of \$0.30 per MSCF.^{3/} The market wage rate is taken as the shadow rate, since most of the labor employed in the project is skilled or management personnel and, in any event, the wage bill is not a large proportion of production costs. Import duties and interest during construction are excluded from the capital costs for the economic analysis. Finally, local costs are converted at the official foreign exchange rate of TK 7.50 per U.S. dollar and a twelve-year operating life is assumed.

^{1/} Details about the economic production costs are given in Annex 14.

^{2/} See discussion in Annex 19

^{3/} Refer to Annex 19 for further details. Local costs are converted at the official rate of TK 7.50 per U.S. dollar

C. Economic Rate of Return and Sensitivity Analysis

3. The economic costs and benefit streams for the project are shown in Annex 20; and the economic rate of return and sensitivity analyses in Annex 21. The economic return is 21.2% and the sensitivity analysis shows that the use of a shadow exchange rate of Tk. 14.0 per U.S. dollar will result in raising the return to 25.0%. On the other hand, if the natural gas shadow price is based on an energy cost of \$1.40 per million BTU^{1/} (equivalent to \$9-\$10 per barrel of crude oil), on the assumption that the gas is a tradeable commodity, then the rate of return falls to 17.8%. The rate of return is also sensitive to capital cost increases. A 20% cost overrun reduces the return by 3.6%. The rate of return is still satisfactory even under fairly adverse assumptions, as shown below for three different prices of urea fertilizer.

Urea Economic Price in \$/ton	<u>Economic Rate of Return for Various Prices of Urea</u>		
	<u>155</u>	<u>175^{2/}</u>	<u>195</u>
Cases			
a. Base Case	18.2	21.2	24.0
b. Operating Cost Up 20%	17.0	20.2	23.0
c. Slower Capacity Build-Up ^{3/}	16.6	19.4	22.0
d. One Year Delay in Construction	16.6	19.2	21.6
e. 20% Cost Overrun	14.8	17.6	20.2
f. 20% Cost Overrun and One Year Delay in Construction	13.6	16.0	18.4
g. Economic Cost of Gas at \$1.31 per MSCF	14.6	17.8	20.8
h. Shadow Exchange Rate at Tk. 14.0 per U.S. dollar	22.0	25.0	27.8

D. Annual Foreign Exchange Savings

4. The detailed derivation of the annual foreign exchange savings is shown in Annex 22. The assumptions underlying the calculation are explained in Annex 19. The results are summarized below for the base case and a 90% capacity utilization.

- ^{1/} Since the Titas gas has an average net heating value of 938 BTU per MSCF, the shadow price would be \$1.31 per MSCF.
- ^{2/} Year 1-50%, year 2-60%, year 3-70%, year 4-80%, years 5 to 12-90%.
- ^{3/} Composed of f.o.b. \$145 plus ocean freight of \$25 plus local port handling of \$5 per ton (the c.i.f. price is \$170 per ton).

Urea Price in \$/ton	<u>Foreign Exchange Savings for Various Prices of Urea</u>		
	<u>150</u>	<u>170</u> ^{1/}	<u>190</u>
Annual Foreign Exchange Savings (\$ Million)	64.3	73.9	83.3
Foreign Exchange Savings, \$/ton	135.3	155.5	175.3

^{1/} The price/ton is \$5 less than that used in the preceding table because the port handling charges have been excluded for purposes of calculating the FX savings.

IX. PRP ISSUES RESOLVED

A. Past Performance of BFCPC's Fertilizer Enterprises

1. Four major fertilizer plants are under the control of BFCPC: the Ghorasal urea unit; the two triple superphosphate units at Chittagong; and the ammonium sulphate/urea unit at Fenchuganj. The Ghorasal urea plant has a rated output of 1,137 MTD low biuret urea and was built by the Toyo Engineering Company under Japanese aid, with the Power Gas Corporation of the U.K. acting as the Corporation's technical advisor. The plant employs approximately 1,100 persons and is under the control of a General Manager assisted by a Factory Manager.

2. The performance record of the project since being taken over from the contractor has been poor. In October 1970, almost immediately after "take-over", a crack developed in the Waste Heat Boiler drain tube necessitating a two month shutdown of the entire works. Subsequently, shortly after the plant was re-started in December 1970, due to poor control of the boiler feedwater treatment units, silica was deposited on the steam turbine blades which required a further two month shutdown to permit cleaning and repairs. Shortly after the plant was re-started after this, the war intervened forcing it to shut down again. In June 1972, a team of experts from the Toyo Engineering Company returned to Ghorasal and began cleaning and restoring the plant after its long shutdown and it was restarted in August 1972. Between then and June 1973, however, the plant suffered ten shutdowns of varying durations, largely as a result of "fail safe" automatic instrumentation. Due to a lack of confidence in the capabilities of the available operators, automatic instrumentation had been set to shut down the plant at the first sign of unsafe or unstable conditions, before major damage could occur. It has been conceded by the contractor that some shutdowns were due to incorrectly functioning instruments. With increasing confidence in the operators to detect and correct minor malfunctions, the sensitivity of the automatic shutdown devices has been reduced, largely eliminating the problem.

3. In June 1973, however, problems in the auxiliary boiler were encountered involving several burst superheater tubes and leading to a shutdown of 90 days. The extraordinary length of time elapsing before restarting the plant was reported to be due to a lack of the necessary skilled welders in Bangladesh to make repairs and the failure, due to administrative bottlenecks, to secure promptly the necessary technicians from Japan. The plant was finally restarted in August 1973 but problems with the boiler superheater tubes persisted ultimately requiring more than 10% of the tubes to be taken out of service, thus severely

limiting the output of the plant. As mentioned in Section IV, paragraph A of this paper, the plant recently suffered an explosion in the control room which has shut it down completely for an estimated 12 months.

4. The first of the two triple superphosphate units, known as TSP-1, has a rated capacity of 32,000 MTY and was completed in 1969. Originally, it had been intended to construct a single superphosphate plant and a bidding competition for such a project was won by a U.S. company, Technical Enterprises. Subsequently, however, it was decided to change the project to TSP, for which French aid funds had become available. Attempts were made to start TSP-1 in 1969 using Jordanian phosphate rock. The plant, however, had been designed to use either Moroccan or Florida rock and could not cope with the high fluoride, chloride and silica content of the substitute material. Consequently, severe corrosion took place in the phosphoric acid plant equipment and the works quickly had to be shut down for repairs. Some replacement pieces of equipment were received in 1970, but before the balance of the items were received and the repairs could be completed, the war intervened. After the war, the remainder of the replacement equipment was received; however, installation was further delayed because the contractor did not want to commence work until such time as the corporation had secured supplies of suitable phosphate rock with which to re-start the plant.

5. Prior to the completion of TSP-1, it was realized that considerably greater quantities of phosphate fertilizers would be needed; and so, in 1969, construction of TSP-2 was commenced by Hitachi of Japan on a turnkey basis financed by Japanese suppliers' credits. The plant, with a rated capacity of 120,000 MTY, was completed in November 1970, but Hitachi would not agree to it being started on Jordanian rock, which it was not designed to process. Consequently, the plant lay idle until the war came in August 1971 when slight damage was sustained. After the war, in November 1972, another contract was negotiated with Hitachi to return and repair and recondition the plant for start-up; this work was completed by March 1973. As in the case of TSP-1, however, start-up was delayed until suitable raw materials could be obtained. Production has finally started at TSP-2 and production for 1974/75 is estimated at 48,000 MT.

6. The first of the corporation's four existing fertilizer manufacturing units was set up at Fenchuganj (about 12 miles south of Sylhet) in 1961. The plant had a design capacity of 106,000 MTY urea with about 12,000 MTY by-product ammonium sulphate and took its supply of raw materials from the Haripur gas field. This plant was based on conventional reciprocating compressor ammonia technology and a partial recycle urea process. It operated

satisfactorily over the years 1962 to 1970, achieving an average annual output over the period of 87% of rated capacity. Although reportedly suffering no damage, it was shut down during the war, and after restarting failed to achieve its previous performance, production steadily dropping to 35,911 tons urea in the year 1972/73, or about 32% of rated capacity. The plant is undergoing a thorough overhaul and is expected to restart in the near future; but, in view of the age of the equipment in the plant, a return to the production levels of the 1960's is not likely.

7. As a result of BFCPC's past management and production record, the A.I.D. loan agreement specifies that BFCPC's involvement in this project will be minimal.

B. Management Assistance

8. In view of the foregoing, it is understandable that the lenders decided not to rely on BFCPC for any managerial assistance. A requirement to seek substantial outside management assistance for this project was recognized by both the BDG and the lenders during the loan negotiations and, consequently, adequate funds for this have been included in the cost projections. The Technical Advisor, on behalf of AFCC, has prepared draft Terms of Reference for the required assistance as well as an announcement for publication which states AFCC's intent to invite, on a worldwide basis, proposals for Management Assistance services. The intent of the lenders is to have AFCC obtain a qualified contract team of experts experienced in both managing projects during the construction phase and operating plants after start-up. Contract advisors are expected to fill key line, advisory and training positions for a period of up to six years within the AFCC organization.

9. It is possible that, due to the site location, living conditions, etc., AFCC will not be able to locate an organization willing to provide all of the management services desired. In this case, A.I.D. and the other lenders will require that either the prime contractor or the Technical Advisor provide the required services which cannot be included in the Management Assistance contract. Adding the management assistance on to the one, or both, of the other contracts would not be ideal, but under the circumstances, it might be the best that the lenders will be able to obtain. In any event, the A.I.D. loan agreement requires that AFCC obtain outside management assistance.

C. Marketing and Distribution

10. As discussed in Section III of this paper, the marketing and distribution system in Bangladesh has recently shown some major

faults and has come under increased criticism. As consumption of fertilizer increases, the system is less and less able to function properly. Recognizing that improvements are essential, A.I.D. funded the first phase of a two phase study to determine what institutional, organizational and policy changes and improvements need to be made to improve the system. The second phase of the study will fill in some of the gaps in the Phase I study and identify distribution and marketing projects.

11. The Government has agreed to review the findings of both Phase I and Phase II of the study with the co-lenders and to take the necessary actions required to eliminate any physical and/or institutional constraints which may arise as the volume of fertilizer grows. Phase I of the study has been completed, but it did not fully satisfy the co-lenders in terms of making specific recommendations; therefore, Phase II of this study is now under discussion. This study, when completed, should provide the basis for an agreement between the Government and the lenders on the objectives and required actions necessary to improve the marketing and distribution systems. The scope of work for Phase II must be approved by A.I.D. as a Condition Precedent to disbursing any funds under our loan.

X. LOAN TERMS, CONDITIONS AND COVENANTS^{1/}

A. Loan Terms

1. The A.I.D. loan will be extended to the BDG at minimum statutory terms of 40 years with a 10-year grace period on the repayment of principal and interest at 2% per year during the grace period and 3% per year thereafter. The proceeds of the A.I.D. loan will be relent by the BDG to AFCC for 15 years including a 5-year grace period on the repayment of principal and interest at 10% per year.^{2/}

B. Loan Conditions and Covenants

2. The A.I.D. Loan Agreement will contain conditions precedent to disbursement and particular covenants and warranties which will be substantially the same as those in the agreements of the other lenders.^{3/} General agreement on all points was reached between the BDG and the lenders on these conditions during the November loan negotiations in Washington. See Articles IV and V ? Annex 24 for specific details.

^{1/} A draft of the complete Loan Agreement is shown in Annex 24.

^{2/} See draft Financing Agreement between BDG and AFCC shown in Annex 27.

^{3/} Iran has not yet negotiated the terms and conditions of its loan.

XI. LOAN IMPLEMENTATION

A. Procurement Procedures

1. Section V, paragraph E, of this paper describes the general plan for project management and execution, and Section VI, paragraph C, gives a general description of the plan for the procurement of the necessary materials and services. The approach was devised and adopted, in principle, by the parties attending the November 1974 loan negotiations in Washington, D. C., and has been formalized in a "Memorandum of Agreement Regarding Project Execution, Procurement and Use of Loan Funds" attached as Annex 29. It is expected that this memorandum will be formally agreed to by each lender and the Borrower not later than execution of the respective loan agreements; IDA has already approved the memorandum, which will constitute the basis for the physical implementation of the project.

2. The procurement plan reconciles, to the extent possible, four key considerations:

- (i) Amount and source of the separate loans;
- (ii) Amount and source of the tied procurement (representing approximately 34% of foreign financing);
- (iii) Most economic and effective use of the available financing;
- (iv) Special lender procurement procedures and regulations.

As a result, we have assurance that A.I.D. procurement requirements will be complied with and that all loans will be used to best advantage.

3. As foreseen in the memorandum, the contract draft included in the Invitation to Bid (IFB) for the general contract, which has been reviewed and approved by the lenders, requires the General Contractor to prepare the detailed procurement procedures to be followed. These procedures will be developed with the advice of the Ashuganj Fertilizer and Chemical Company (AFCC) and the Technical Advisor and will be subject to the approval of the lenders.

4. IDA will continue to act as coordinator with the other lenders, and between the lenders and the BDG, where matters of common concern are involved. With respect to such matters as satisfaction of conditions precedent, adherence to loan agreement covenants, appropriate A.I.D. review and approval of procurement documents, contracts and financing arrangements, A.I.D. (and each of the other lenders) will, however, act as a bilateral lender.

B. Construction and Disbursement Timetables

5. Project construction is estimated to be completed 39 months after the General Contract is awarded. The project schedule, presented in Annex 12, anticipates that this contract will be awarded in June 1975 and construction will be completed and the plant turned over to AFCC in August 1978. The contract for technical advisory services to AFCC has been awarded to a joint venture of Scientific Design Company, Ltd. (U.K.) and James Chemical Engineering (U.S.). The contract for site development was awarded to Vinnell Corporation (U.S.) in October 1974 with the work scheduled to be completed in November 1975.

6. As about 70% of the A.I.D. financing has been preallocated to specific items--the balance to be attributed on the basis of future contract awards to A.I.D. Code 941 suppliers resulting from international competitive bidding--it is not possible to project the draw down of the A.I.D. loan with any precision. However, the initial disbursement under the loan will occur in early 1975 as a result of our agreement to consider the site development contract as an eligible item subject to the approval of the loan and our approval of the contract with Vinnell. The U.S. dollar target cost of the Vinnell contract is \$6,882,706, most of which will be disbursed in 1975. Disbursements are likely to peak in 1977 when most of the equipment should be delivered. The remainder of equipment deliveries, and all final payments due after installation and testing, would account for disbursements in 1978. Revised estimates of disbursements should be possible after a detailed construction schedule has been prepared by the General Contractor. It should be noted that disbursements under the loan will exceed the three-year limit, specified in PD 57, because of the construction period required for this project.

<u>Calendar Year</u>	<u>Estimated Disbursements</u> <u>(in Millions \$)</u>
1975	\$ 7.0
1976	3.0
1977	15.0
1978	5.0
	<u>\$30.0</u>

XII. STATUTORY AND POLICY CONSIDERATION

A. Relationship of Project to U.S. Program

1. A.I.D.'s development program in Bangladesh concentrates upon two sectors, agriculture and rural development on one hand, and population on the other. This project fits well into the USG's efforts to assist the BDG with much needed improvements in agriculture. Even with the most favorable weather conditions, Bangladesh produces only enough foodgrain to feed its population for 11 months per year. Increased agricultural production depends upon increasing yields per acre, as well as increasing the cropping intensity. Achievement of these objectives, in turn, depends upon agricultural research, the availability of sufficient quantities of fertilizer, controlled water supply at the right time, and reasonable agricultural pricing and food policies. Since Bangladesh possesses excellent feedstock for urea manufacture, it is appropriate in the context of A.I.D.'s sectoral objectives and the deepening impact of the food-fertilizer-oil shortages, for A.I.D. to join with other donors in financing the construction of a large scale urea plant.

2. The project, when completed, will more than double Bangladesh's urea production capacity. It is felt that this added production will significantly increase the availability of urea to the small farmers, and since it is usually the small farmers who are the first to suffer when supplies are short, this loan is in line with A.I.D.'s new directions. In a further effort to benefit the small farmers through this loan, A.I.D. has insisted that the fertilizer marketing and distribution study discussed in Section III be done to insure that the system functions more adequately.

B. Impact on the U.S. Balance of Payments

3. The impact of this loan on the U.S. balance of payments will be favorable. The proceeds of the A.I.D. loan, while available to finance purchases in 941 countries, will probably all be spent in the U.S. for goods and services. It is expected, based on considerable past experience, that U.S. suppliers will be competitive on some of the materials and services procured for the project and financed by some of the other lenders. Thus, while the U.S. is lending \$30.0 million, there will, no doubt, be more than this amount spent in the U.S. for this project.

C. BDG's Balance of Payments and Debt Service

4. Bangladesh's balance of payments position, weak to begin with, has deteriorated steadily over the past two years. Foreign exchange

reserves, which had grown to \$277 million in December 1972 due principally to the fact that the import trade had been disrupted even more than exports, fell to \$86 million in February of this year. While we have no further official figures, reserves were reported exhausted by mid-1974 and the July-December import licensing program drastically curtailed accordingly. Imports other than food and items financed by foreign aid were cut from \$431 million in the first half of 1974 to \$293 million in the second.

5. Exports, which never attained more than 80% of the prewar level, fell back in FY 1974. While the Government of Bangladesh forecasts a 32% rise in FY 1975, the IMF, after examining prospects for specific exports, concludes that the increase will be insignificant. FY 1974 non-food imports were less than 70% of prewar imports. To import even this reduced market basket plus the increased volume of food imports needed would mean at least a 30% increase in imports in FY 1975. The following is our balance of payments projection at this import level.

	(\$ Millions)		
	1972/73 <u>Actual</u>	1973/74 <u>Estimated</u>	1974/75 <u>Projected</u>
Imports	751	814	1058
Exports	389	377	382
Net Service and Private Transfers	-22	-66	-70
C/A Balance	-384	-503	-746
Receipts of Aid	378	434	
Net IMF and Other Short Term	11	-	
Reserve Changes	+5	-69	

6. Unless there is a very marked increase in aid, Bangladesh will not be able to support so large a current account deficit. Only oil producer aid could possibly be forthcoming in amounts large enough, but thus far, aid from this source has been slow with only \$11 million expected to flow in FY 1975 from commitments already in place. Import licenses, as indicated above, have been slashed drastically and will probably be slashed again in the second half.

7. Bangladesh's debt service burden was only \$18 million in FY 1974, rising to only \$28 million in FY 1975, an indication of success, thus far, in getting aid on either grant or very soft loan terms with long grace periods, appropriate to its situation. Although we do not have an accurate estimate of the amount of former Pakistan debt Bangladesh will assume under the current plan for debt division, the service burden will be very light, with creditors expected to reschedule at 84% grant element or better. We expect that all donors will continue to provide assistance

either on a grant or concessional loan terms as required by Bangladesh's status as one of the least developed countries. Overall, we feel that the prospects for repayment of this \$30 million loan appear reasonable.

D. Economic, Technical and Financial Conclusions

8. The A.I.D. Project Committee has reviewed this project and is satisfied that the project is economically, technically and financially viable and meets all applicable statutory and regulatory criteria. The project is of high priority in the context of the BDC's policy to attain self-sufficiency in food and to increase agricultural output. The project shows a satisfactory economic rate of return and is financially viable; urea production in Bangladesh will be competitive with imports even if present world market prices for urea should substantially decline. The project proposal is based on a level of technical planning sufficient to arrive at reasonably precise cost estimates and, therefore, meets the requirements of Section 611 of the Foreign Assistance Act. Finally, it puts to profitable use a valuable national asset, natural gas.

9. Assumptions on fertilizer market growth and sales build-up have been made on a conservative basis. Fertilizer consumption in Bangladesh is still among the lowest in the world, and the Government is making substantial efforts to accelerate the growth of agricultural production. A slackening in demand substantial enough to jeopardize the profitable operation of the project is, therefore, not expected. If other adverse developments should occur, such as construction delays or a slower build-up of production than assumed in this report, the effects on the economics of the project are well within the margin of acceptable risks, as shown in the economic analysis.

BANGLADESH-ASHUGANJ FERTILIZER PROJECT

FERTILIZER CONSUMPTION AND SUPPLY

A. Historical Consumption Data

1. Fertilizer use grew rapidly from 11,000 product tons in 1955/66, to 66,000 tons in 1960/61 to about 306,000 tons in 1970/71, an increase of over 12.1 percent annually. During the struggle for independence, local production and imports of fertilizer were seriously disrupted, resulting in a severe fertilizer shortage and drop in consumption to 252,000 tons in 1971/72. In 1972/73 consumption rose sharply to 375,000 tons. While the total quantity of fertilizer has grown rapidly, there has been only a very slight increase in the use of higher analysis fertilizers and a slow, barely perceptible shift towards increasing the proportions of phosphatic and potassic nutrients in the total amount of nutrient. Urea, triple super phosphate (TSP) and muriate of potash (MP) are, (with the exception of relatively small amounts of ammonium sulphate used only on the tea estates) the only fertilizers now used in Bangladesh. Past consumption by type of fertilizer in Bangladesh since 1963/64 is shown in Table 1 (at the end of this Annex).

2. Fertilizer use varies considerably by district. Tables 2 and 3 (at the end of this Annex) show historical fertilizer sales by district. Table 4 tabulates districtwise fertilizer use in 1972/73 in terms of both product type and nutrient per acre cultivated. The data show considerable variations among the districts. It is particularly interesting that the agriculturally advanced areas of Chittagong, Comilla, Dacca and Kishorganj, which have only 20 percent of the net cultivated area, used nearly half of the fertilizer sold in 1972/73.

B. International Comparative Consumption Data by Nutrient

3. Wide variations in the consumption of fertilizers are found throughout the world, according to the availability of land, water, raw materials and other farm inputs, as well as inherent soil fertility, agricultural practices and cropping patterns. A recent comparison is given below:

Fertilizer Consumption by Country
(kg per hectare of arable land)

<u>Country</u>	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>	<u>Total</u>
Netherlands	467	126	156	749
Belgium	197	174	218	589
Taiwan	178	49	69	296
Japan	157	118	110	385
West Germany	140	113	147	390
Egypt	106	16	0.5	122
United Kingdom	110	75	73	259
USA	41	25	22	88
Pakistan	14	1.5	0.06	15.5
<u>Bangladesh</u>	13.4	4.3	1.2	18.9
India	9	3	1.4	13
Australia	3.4	16.7	1.7	22
World	22.1	13.8	11.5	47.4

Sources: Bangladesh data are for 1972/73 and are from BADC and Ministry of Agriculture. All other data are from FAO et al. 19

4. It can be seen there is ample scope for increased fertilizer use in Bangladesh, not only in terms of N but also in relative and absolute amounts of P₂O₅ and K₂O. Corresponding N:P₂O₅:K₂O ratios are given below:

Comparative World Fertilizer Plant Nutrient Ratios
(in terms of Nutrients)

<u>Country</u>	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
Netherlands	3.7	1	1.2
Belgium	1.1	1	1.3
Taiwan	3.6	1	1.4
Japan	1.3	1	0.9
West Germany	1.2	1	1.3
UAR	6.7	1	0.03
United Kingdom	1.5	1	1.0
USA	1.6	1	0.9
Pakistan	9.0	1	0.02
<u>Bangladesh</u>	3.1	1	0.3
India	3.0	1	0.5
Australia	0.2	1	0.1
World	1.6	1	0.8

NOTE: Differences in application ratios in kg per hectare and corresponding nutrient ratios reported by various sources sometimes arise due to doublecropping and the practice of leaving some land in fallow, especially in some sub-tropical and tropical countries. Thus, it may be difficult to distinguish between "cultivated" land and "arable" or "cropped land". The above comparisons are made on a reported arable land basis to the extent discernable.

C. Procurement of Fertilizer

5. Bangladesh has in recent years imported the bulk of its fertilizer. The following table summarizes the historical import data.

Bangladesh - Imports of Fertilizer by Type a/
(in tons of product)

	<u>Urea</u>	<u>TSP</u>	<u>MP</u>	<u>Total</u>
1963/64	-	-	-	-
1964/65	-	20,063	-	20,063
1965/66	5,775	48,669	7,200	61,644
1966/67	59,399	46,232	11,829	117,460
1967/68	62,698	57,211	10,000	129,909
1968/69	88,424	88,648	24,045	201,117
1969/70	113,041	15,979	34,149	163,169
1970/71	105,084	148,576	1,741	255,401
1971/72	108,332	2,689	-	111,021
1972/73	123,600	116,256	-	239,856

a/ Excludes ammonium sulfate (AS) due to the lack of consistent series for AS

6. The establishment of the Fenchuganj Urea/AS plant and the Ghorasal urea plant gave Bangladesh a total rated capacity of about 450,000 tons per year of urea and 12,000 tons per year of AS. The Fenchuganj plant's production, however, has fluctuated considerably. Urea output from Fenchuganj as a percentage of capacity has varied from over 100% in 1967/68 to less than 35% in 1972/73. The Ghorasal plant was just being broken in during 1970/71 when technical problems led to disruption of its production. It was reportedly operating at about 75% of capacity during the first half of 1973/74. Although there are two TSP plants with a combined rated capacity of 150,000 tons per year, they have not yet produced any fertilizer. The following table summarizes procurement of fertilizers from local factories:

Procurement^{a/} of Locally Produced Fertilizer
by Plant and Product Type
(in tons)

	<u>Urea</u>		<u>TSP 1/</u>	<u>Total</u>
	<u>Fenchuganj</u>	<u>Ghorasal</u>	<u>TSP 1+2</u>	
1963/64	53,273	-	0	53,273
1964/65	68,095	-	0	68,095
1965/66	98,701	-	0	98,701
1966/67	81,275	-	0	81,275
1967/68	122,175	-	0	122,175
1968/69	81,214	-	0	81,214
1969/70	96,705	-	0	96,705
1970/71	43,280	43,209 ^{b/}	0	86,489
1971/72	55,959	-	0	55,959
1972/73	35,911	150,790	0	186,701
(Rated Capacity)	(112,500)	(340,000)	(150,000)	(602,500)

a/ Quantities lifted from factories by supply agency. Does not necessarily equal production or consumption. Excludes AS.
b/ First year of operation.

7. The following table summaries local and foreign procurement of fertilizers (excluding AS) in terms of nutrients.

1/ In light of more recent information, the IBRD's projections of TSP production appear to be unduly conservative, but since AFCC will produce only urea, this will have only a very limited effect on the Ashuganj Fertilizer Project.

Bangladesh - Domestic and Foreign
Procurement of Major^{a/} Fertilizer
(in tons of nutrients)

	<u>N</u>			<u>P₂O₅^{b/}</u>	<u>K₂O^{b/}</u>	<u>Total</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Total</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
1963/64	24,506	-	24,506	-	-	24,506	-	24,506
1964/65	31,324	-	31,324	9,229	-	31,324	9,229	40,553
1965/66	45,402	2,656	48,058	22,402	4,320	45,402	29,378	74,780
1966/67	37,386	27,324	64,710	21,267	7,097	37,386	55,688	93,074
1967/68	56,200	28,841	85,041	26,317	6,000	56,200	61,158	117,358
1968/69	37,358	40,675	78,033	40,778	14,427	37,358	95,880	133,238
1969/70	44,484	51,999	96,483	7,350	20,489	44,484	79,838	124,322
1970/71	39,785	48,339	88,124	68,345	1,045	39,785	117,729	157,514
1971/72	25,741	49,833	75,574	1,237	-	25,741	51,070	76,811
1972/73	85,882	56,856	142,738	53,478	-	85,882	110,334	196,216

a/ Excludes AS, for which no consistent series is available at this time. AS was formerly imported by BADC and distributed primarily by the Bangladesh Tea Association and, to a lesser extent, by the Sugar Mills Corporation. Now BTA procures most AS directly from Fenchuganj factory.

b/ No local Production.

D. Projected Fertilizer Demand and Supply

8. As noted above, fertilizer consumption has risen rapidly over the past decade, indicating a strong and growing demand. Severe supply constraints during the struggle for independence caused consumption of fertilizer to fall from about 158,000 nutrient tons in 1970/71 to 77,000 in 1971/72. In 1972/73, in spite of the war, the drought, a doubling of fertilizer prices and the overall poverty of the farmers, demand for fertilizer, supported by rapid increases in rice prices, remained very strong and consumption rose to about 196,000 tons. Farmers frequently reported paying substantially more (two to three times) than the subsidized official fertilizer price (which itself doubled between June 1972 and July 1973 and again increased substantially in April 1974).

9. Demand for fertilizer is expected to continue growing rapidly in the future. How much it will grow depends on a wide range of variables, including the areas under particular crops, the expansion of irrigation, the fertilizer responsiveness of different crops, the relative prices of fertilizers and crops, and the efficiency of the marketing and distribution system. Data on amounts of fertilizer applied to each crop are not available and have to be imputed by relating monthly fertilizer sales to the cropping pattern. Although countless fertilizer trials have been carried out, they have not been constructed to permit determination of the quantity and mix of nutrients which is economically optimal for the farmers in different areas for different crops under conditions of great uncertainty. Generalized fertilizer dose recommendations for the whole

country tend to be based more on abstract notions that balanced dosages are per se good than on well-documented evidence. The recommendations appear to overstate the importance of TSP and MP. The farmers tend to take a different view from that of those who prepare fertilizer dose recommendations. Consequently, while farmers have been quick to purchase urea, they are increasing proportions of TSP and MP only slowly. The inadequacy of available data make it difficult both for the farmer to know what he should do and for the planner to project what he will do.

10. With these factors in mind, an estimate of fertilizer demand was developed for the Bangladesh Basic Economic Report and is compared with the Bangladesh First Five-Year Plan projections below.

Bangladesh - Projected Fertilizer Demand^{a/}
(in '000 tons of produce)

	First Five Year Plan				IDA Estimate			
	Urea	TSP	MP	Total	Urea	TSP	MP	Total
1972/73 (actual)	270	87	18	375	270	87	18	375
1973/74	301	158	61	520	315	105	22	442
1974/75	342	173	74	589	367	128	27	522
1975/76	423	207	104	734	428	156	34	618
1976/77	518	254	134	906	499	189	42	730
1977/78	616	332	187	1,135	583	222	52	857
1978/79	n.a.	n.a.	n.a.	n.a.	630	245	58	933
1979/80	"	"	"	"	682	271	65	1,018
1980/81	"	"	"	"	738	299	73	1,110
1981/82	"	"	"	"	799	330	81	1,210
1982/83	"	"	"	"	866	364	91	1,321

^{a/} See Table 5 at the end of this Annex for details; estimates above exclude ammonium sulfate requirements for tea estates.

The Plan projects total fertilizer demand to grow at 25 percent p.a. between 1972/73 and 1977/78, with urea growing at 18 percent, TSP at 31 percent and MP at nearly 60 percent. The IDA estimate foresees a growth in total fertilizer consumption over the same period of 18 percent annually, with urea, TSP, and MP increasing at annual rates of 16.6 percent, 21 percent, and 24 percent, respectively. The IDA estimate of urea demand in 1977/78 is very close (within 6 percent) to the Plan projection. The major differences between the projections arise from differing assumptions about the rate at which farmers will use TSP and MP and about the rate at which irrigation will be expanded. After 1977/78 the IDA projection shows continued demand growth, but at a somewhat slower rate. While all such projections must be viewed with some caution because they involve a wide range of assumptions about a number of interdependent variables, the IDA projections were prepared by an agronomist with long experience in Bangladesh agriculture and provide a reasonable estimate of the likely orders of magnitude to be expected.

11. Future supplies of locally produced urea will depend on the performance of the existing urea plants and the time at which the proposed new urea plant comes into operation. At the present time, the following assumptions reflect IDA's understanding of the most likely projection of local urea production:

- (a) In 1974/75, Fenchuganj will produce 30,000 tons of urea and Ghorasal 170,000 tons for a total of 200,000 tons of urea (92,000 tons of N). The low levels of output result from extensive plant overhauls planned during 1974/75. ^{1/}
- (b) In 1975/76 and beyond, Fenchuganj will produce 80,000 tons of urea per year and Ghorasal about 272,000 tons for a total of 352,000 tons per year of urea (161,920 tons of N).
- (c) The Ashuganj Fertilizer Plant (the project) will begin operations in the second half of 1977/78 and will produce about 123,000 tons of urea in that year 386,000 tons in 1978/79, 439,000 tons in 1979/80 and 475,000 tons in 1980/81 and subsequent years (or respectively 56,580; 117,560; 201,940; and 218,500 tons of N).

12. The following table compares the IDA projection of urea demand (para. 10) with the projection of local production of urea (para. 11) after converting both into nutrient (nitrogen) equivalents.

Bangladesh - Projected Nitrogen
Demand and Local Production
(in '000 nutrient tons)

	<u>Demand</u>	<u>Local Production</u>	<u>Implied Exports (+) Imports (-) and/or Stock Changes</u>
1974/75	168.8	92.0 ^{1/}	- 76.8
1975/76	196.9	161.9	- 35.0
1976/77	229.5	161.9	- 67.6
1977/78	268.2	218.5	- 49.7
1978/79	289.8	339.5	+ 49.7
1979/80	313.7	363.9	+ 50.2
1980/81	339.4	380.4	+ 41.0
1981/82	367.5	380.4	+ 12.9
1982/83	398.4	380.4	- 18.0

^{a/} Includes AS

^{1/} In light of more recent experience, this projection has been reduced to 40,000 MT or 18,000 MT of nutrient. See Section III, paragraph B of CAP.

Chart 1 (at the end of this Annex) expresses these numbers graphically. The projections imply that demand for nitrogen will exceed local production until 1978/79, the second year of production of the Ashuganj plant. There would then be about four years of modest surplus production before local demand would again exceed supply. Given projected world fertilizer requirements and Bangladesh's natural cost advantage in producing fertilizer (see IFC Report No. 446, Fertilizer Requirements of Developing Countries, May 15, 1974), Bangladesh should experience little difficulty in profitably exporting any fertilizer production in excess of local needs.

13. It is assumed that all MP would continue to be imported. Local TSP production may begin soon, but given past performance it will probably be necessary to continue to import significant quantities of finished TSP. Although no recent thorough study has been done on this subject, expansion of local TSP capacity (which depends entirely on imports of bulky raw materials) would be of questionable profitability.

South Asia Department
June 1974.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

Consumption of Fertilizers ^{a/} by Product Type and Nutrient, 1963/64 - 1972/73
(in '000 metric tons)

	<u>Urea</u> (46% N)	<u>TSP</u> (46% P ₂ O ₅)	<u>SP</u> (18% P ₂ O ₅)	<u>MP</u> (60% K ₂ O)	<u>Total</u>	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>	<u>Total</u>
1963/64	75.0	23.0	2.0	4.1	104.1	34.5	10.9	2.5	47.9
1964/65	71.1	19.0	0.3	3.3	93.7	32.7	8.8	2.0	43.5
1965/66	83.3	20.5	0.1	3.8	107.7	38.3	9.4	2.3	50.0
1966/67	120.9	34.5	0.1	8.3	163.8	55.6	15.9	5.0	76.5
1967/68	152.1	48.1	-	10.8	211.0	70.0	22.1	6.5	98.6
1968/69	159.9	52.9	-	12.4	225.2	73.6	24.3	7.4	105.3
1969/70	196.4	65.9	0.1	15.4	277.8	90.3	30.3	9.2	129.8
1970/71	212.4	75.6	0.1	17.8	305.9	97.7	34.8	10.7	143.2
1971/72	169.8	60.1	-	13.9	243.8	78.1	27.6	8.3	114.0
1972/73	272.0	87.9	-	18.1	378.0	125.1	40.4	10.9	176.4

^{a/} Excludes A.S. for which no consistent series is available.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

Districtwise Fertilizer Sales and Cultivated Areas ^{a/}
(000 tons)

<u>Name of District</u>	<u>1962/63</u>	<u>1963/64</u>	<u>1964/65</u>	<u>1965/66</u>	<u>1966/67</u>	<u>1967/68</u>	<u>1968/69</u>	<u>1969/70</u>
Dacca	6.3	8.2	7.9	10.6	14.2	17.5	20.9	27.4
Kishoreganj	3.3	9.2	6.2	7.6	11.1	14.1	12.8	16.2
Mymensingh	2.4	7.4	4.6	7.5	13.9	14.7	15.5	20.6
Faridpur	0.8	1.4	1.3	0.8	1.7	1.7	3.0	3.5
Chattagong	10.9	13.1	16.8	21.0	29.2	45.3	31.7	45.1
Chittagong-Hill-Tracts	0.4	0.8	0.4	0.4	1.0	1.9	2.5	3.2
Noakhali	2.3	8.1	3.9	4.7	8.4	9.3	11.0	14.1
Comilla	5.3	8.7	8.4	12.0	17.7	22.6	26.2	33.5
Sylhet	1.5	2.9	3.1	3.8	5.7	7.0	9.2	12.7
Rajshahi	3.4	10.7	10.2	10.4	10.8	11.7	11.8	13.4
Dinajpur	2.3	4.7	3.1	2.0	6.9	10.9	13.2	13.9
Rangpur	2.3	6.5	6.0	4.3	6.1	11.1	15.4	12.7
Bogra	4.3	5.9	5.1	5.5	12.2	14.5	16.3	17.4
Pabna	0.7	3.0	3.3	2.6	4.1	5.0	6.1	7.0
Khulna	1.2	2.2	2.3	2.6	3.1	4.4	5.7	7.2
Barisal	0.9	3.3	2.8	2.4	4.2	5.8	8.5	13.2
Jessore	1.0	3.5	4.7	4.1	5.2	7.2	7.7	8.3
Kushtia	0.9	2.9	3.8	3.8	4.6	4.6	5.1	7.8
Country Total:	<u>50.2</u>	<u>102.4</u>	<u>93.8</u>	<u>106.2</u>	<u>160.1</u>	<u>208.7</u>	<u>222.8</u>	<u>277.2</u>

Source: B.A.D.C.

^{a/} Unadjusted for late reporting in various districts, hence totals may not correspond exactly to figures in Table 8 which have been adjusted.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

Statement Showing Districtwise Sales of Fertilizers from 1970/71 to 1972/73 a.
(in '000 tons)

No. 1	Name of District 2	1970/71				1971/72				1972/73			
		Urea 3	T.S.P. 4	M.P. 5	Total 6	Urea 7	T.S.P. 8	M.P. 9	Total 10	Urea 11	T.S.P. 12	M.P. 13	Total 14
1.	Dacca	25.62	7.94	1.52	35.08	16.56	6.54	1.29	24.39	33.38	7.18	1.22	41.78
2.	Kishoregonj	15.33	2.90	0.55	19.83	7.57	1.13	0.25	8.95	24.47	3.77	0.71	28.95
3.	Mymensingh	13.86	2.77	0.62	17.25	8.16	2.25	0.47	10.88	16.72	2.65	0.69	20.06
4.	Tangail	5.28	1.90	0.63	7.81	2.98	1.01	0.63	4.62	4.82	1.73	0.65	7.20
5.	Faridpur	2.76	1.34	0.69	4.79	4.95	1.19	0.68	6.82	5.07	1.39	0.53	6.99
6.	Chittagong	31.21	9.41	1.12	41.74	28.60	11.44	1.55	41.59	40.87	14.54	1.31	56.72
7.	Chittagong N. Tracts	0.84	0.50	0.22	1.56	1.70	0.58	0.30	2.58	1.03	0.57	0.20	1.80
8.	Moakhali	12.03	4.15	0.40	16.58	7.76	2.46	0.23	10.45	14.16	4.92	0.81	19.89
9.	Comilla	20.59	12.07	2.49	35.15	20.47	7.43	2.24	30.14	34.86	13.31	2.84	51.01
10.	Sylhet	6.71	2.46	0.48	9.65	14.92	2.26	0.39	17.57	14.66	5.52	0.44	20.62
11.	Rajshahi	10.92	3.54	1.09	15.55	4.76	2.85	0.63	8.24	9.01	3.31	1.39	13.71
12.	Dinajpur	5.69	4.54	1.95	12.18	5.14	2.19	0.73	8.06	7.37	4.69	1.44	13.50
13.	Rangpur	11.57	2.39	1.00	14.96	8.85	1.89	0.79	11.53	8.87	3.54	1.23	13.64
14.	Bogra	14.89	3.80	0.97	19.66	5.69	3.47	0.64	9.80	9.52	3.38	1.22	14.12
15.	Fabna	6.48	1.85	0.51	8.84	3.72	1.83	0.46	6.01	7.41	3.15	0.88	11.44
16.	Khulna	6.00	1.36	0.32	7.68	4.74	1.63	0.28	6.65	4.84	1.65	0.25	6.74
17.	Dakerganj	9.07	4.56	1.12	14.75	10.49	4.52	1.08	16.09	16.76	5.93	0.79	23.48
18.	Fatuakhali	3.01	3.70	0.67	7.38	3.40	1.93	0.30	5.63	3.30	1.42	0.11	4.83
19.	Jessore	5.70	1.93	0.39	8.07	5.68	1.54	0.37	7.59	5.55	1.87	0.42	7.84
20.	Kushtia	4.75	1.74	0.66	7.15	3.64	1.79	0.61	6.04	6.86	2.79	0.91	10.56
	Total	<u>212.36</u>	<u>74.90</u>	<u>17.40</u>	<u>304.66</u>	<u>169.78</u>	<u>59.93</u>	<u>13.92</u>	<u>243.63</u>	<u>269.53</u>	<u>87.31</u>	<u>18.04</u>	<u>374.88</u>

a/ Unadjusted for late reporting in various districts, hence totals may not correspond exactly to figures in Table 8 which have been adjusted.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

NET CROPPED AREA AND FERTILIZER USE BY DISTRICT 1972/73 b/

District	Net Cropped Area ^{a/} (['] 000 Acres)	Fertilizer Use By Type of Product (['] 000 Tons)				Product Use Per Acre (in lbs./acre)	Fertilizer Use By Nutrient (['] 000 Tons)				Nutrient Use Per Acre (in lbs./acres)	NPK Ratios
		Urea	TSP	MP	Total		N	P ₂ O ₅	K ₂ O	Total		
Dacca	1,318	33.38	7.18	1.22	41.78	71.0	15.4	3.3	.7	19.4	33.0	100:21:5
Kishoreganj	983	24.47	3.77	.71	28.95	66.0	11.5	1.7	.4	13.4	30.5	100:15:4
Mymensingh	1,459	16.72	2.65	.69	20.06	30.8	7.7	1.2	.4	9.3	14.3	100:16:5
Tangail	588	4.82	1.73	.65	7.20	27.4	2.2	.8	.4	3.4	13.0	100:36:18
Faridpur	1,260	5.07	1.39	.53	6.99	12.4	2.3	.6	.3	3.2	5.7	100:26:13
Chittagong	756	40.87	14.54	1.31	56.72	168.1	18.8	6.7	.8	26.3	77.9	100:36:4
Chittagong H. T.	178	1.03	.57	.20	1.80	22.7	.5	.3	.1	.9	11.3	100:60:20
Naokhali	947	14.16	4.92	.81	19.89	47.0	6.5	2.3	.5	9.3	22.0	100:15:8
Comilla	1,358	34.86	13.31	2.84	51.01	84.1	16.0	6.1	1.7	23.8	39.3	100:38:11
Sylhet	1,879	14.66	5.52	.44	20.62	24.6	6.7	2.5	.3	9.5	11.3	100:37:4
Rajshahi	1,698	9.01	3.31	1.39	13.71	18.1	4.1	1.5	.8	6.4	8.4	100:37:20
Dinajpur	1,242	7.37	4.69	1.44	13.50	24.3	3.4	2.2	.9	6.5	11.7	100:65:26
Rangpur	1,607	8.87	3.54	1.23	13.64	19.0	4.1	1.6	.7	6.4	8.9	100:39:17
Bogra	744	9.52	3.38	1.22	14.12	42.5	4.4	1.6	.7	6.7	20.2	100:36:16
Fabna	950	7.41	3.15	.88	11.44	27.0	3.4	1.4	.5	5.3	12.5	100:41:15
Khulna	1,040	4.84	1.65	.25	6.74	14.5	2.2	.8	.2	3.2	6.9	100:36:9
Bakerganj	1,185	16.76	5.93	.79	23.48	44.4	7.7	2.7	.5	10.9	20.6	100:35:6
Patuakhali	695	3.30	1.42	.11	4.83	15.6	1.5	.7	.1	2.3	7.4	100:47:7
Jessore	1,231	5.55	1.87	.42	7.84	14.3	2.6	.9	.3	3.8	6.9	100:35:11
Kushtia	643	6.86	2.79	.91	10.56	36.8	3.2	1.3	.5	5.0	17.4	100:41:16
Total	21,763	269.53	87.31	18.04	374.88	38.6	124.0	40.1	10.8	174.9	18.0	100:32:9

a/ Net cropped area is for 1969/70, the most recent "normal" year for which data are available.

b/ Unadjusted for late reporting of data from certain districts, hence totals here may not correspond precisely to the adjusted data in Table 8.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

**Estimated Fertilizer Use^{a/} in 1969-70 and 1972-73,
and Projections^{b/} for 1977-78, 1982-83 and 1992-93**

	1969-70			1972-73			1977-78			1982-83			1992-93		
	Area Million Acres	Rate lb/ Acre	'000' Tons	Area Million Acres	Rate lb/ Acre	'000' Tons									
A. Rice															
Aus (i) Broadcast Local	8.42	10	38	7.08	10	34	5.7	16	41	3.50	20	32	2.50	25	28
(ii) " " HVV	-	-	-	-	-	-	-	-	-	4.50	120	245	4.50	130	265
(iii) T. Aus - HVV	0.04	100	2	0.16	100	7	0.3	150	20	0.60	175	48	1.00	185	84
Aman (i) B. Aman	5.15	-	-	4.62	-	-	5.0	-	-	4.50	-	-	4.00	-	-
(ii) T. Aman - Local	9.66	28	120	8.12	29	107	4.75	45	96	2.25	50	51	1.50	55	37
(iii) T. Aman - HVV - Rainfed	-	-	-	1.33	120	75	3.20	135	193	4.50	140	286	3.00	150	204
(iv) T. Aman - HVV - Irrigated	3	100	1	.05			1.75	160	125	2.75	175	218	5.00	185	420
Boro (i) Local	1.60	34	25	1.10	35	17	1.00	50	32	0.85	60	23	0.70	70	22
(ii) HVV	0.58	130	34	1.33	150	91	2.00	175	161	3.00	200	272	5.00	200	454
Rice Total	25.48	19.4	220	23.79		329	26.20		768	26.45		1,232	27.20		1,514
B. Wheat	0.30	10	1	0.30	10	1	0.50	25	6	0.70	60	19	1.00	80	36
Rice & Wheat Total	25.78		221	24.09		330	26.51		774	27.15		1,194	28.00		1,550
C. Sugarcane	0.40	73	13	0.38	73	13	0.40	120	22	0.45	150	31	0.45	200	40
D. Jute & Mesta	2.54	22	24	2.26	22	23	2.54	40	46	2.80	60	76	3.00	80	109
E. Other Crops Except Tea	3.86	5	19	4.10	5	9	4.20	8	15	4.50	10	20	4.50	15	31
Total Crops Other than Tea (Urea & T.S.P. & MP)	32.58		277^{d/}	31.23		375^{d/}			857^{d/}			1,321^{d/}			1,730^{d/}
F. Tea	0.10	291	13 ^{c/}	0.10	145	7 ^{c/}	0.11	300	15 ^{c/}	0.12	312	1 ^{c/}	0.13	339	20 ^{c/}

^{a/} Based on actual monthly and annual fertilizer sales of BADC for 1969-70 and 1972-73, with NPK ratio of 100:32:10 for 1969-70 and 100:32:9 for 1972-73.
^{b/} Mission projection.
^{c/} Ammonium Sulphate.
^{d/} Projected use by type of fertilizer:

	'000' Tons	196	1972-73	1977-78	1982-83	1992-93
Urea		196	270	583	866	1,102
Triple Superphosphate	"	66	87	222	364	496
Muriate of Potash	"	15	18	52	91	132
Ammonium Sulphate	"	13	7	15	17	20

BANGLADESH - ASHUGANJ FERTILIZER PROJECT
MARKETING AND DISTRIBUTION OF FERTILIZER

A. The Marketing and Distribution System

1. The Bangladesh Agricultural Development Corporation (BADC) imports and procures locally nearly all fertilizer distributed in Bangladesh^{1/}. BADC is broadly responsible for procurement of virtually all agricultural inputs, machinery and equipment and for the distribution of seeds and fertilizer. It also runs government seed multiplication farms, deploys, operates and maintains low-lift pumps and deep tubewells, sinks and maintains shallow tubewells and deploys and maintains tractors and power tillers. Chart 1 shows the overall organizational structure of BADC.
2. Within BADC, the Supply Wing is responsible for the procurement and distribution of fertilizer. Chart 2 shows the organization structure and staffing of the Supply Wing. The fertilizers are imported or procured ex-factory locally by the purchase division of the Supply Wing. They are then transferred to the General Manager (Supply) who is responsible for the movement, shipping, storage and sales of fertilizer. BADC is responsible for the movement of fertilizers down to the Thana level. At the Thana level it is purchased either by one of the 29,000 private licensed retail dealers or, in the case of 62 of the 413 Thanas, by the Thana Central Cooperative Association (TCCA), which acts as a wholesale agent and resells the fertilizer either to its member village cooperatives or to private retail agents. Private agents pay BADC for the fertilizer in cash. The TCCAs, once they have obtained the requisite bank guarantee, purchase the fertilizer from BADC on credit.
3. Considering the inherent difficulties of transportation in Bangladesh this fertilizer distribution system has worked rather well in the past. It has proven flexible enough to handle the massive expansion in fertilizer use over the last decade. It has also, through the vast network of small dealers, brought fertilizer to within the reach of virtually every farmer in Bangladesh. The dealers as a matter of course sell fertilizer in minute quantities - often only a few kilograms at a time - so that a farmer can buy the precise amount he wants and can afford. This is an important advantage in a land of small farmers.
4. With the price distortions and the severe general fertilizer shortages of the past few years, however, the system has shown faults and attracted increasing criticism. Many factors are involved in this. The disequilibrium between the Indian and Bangladesh official exchange rates has provided a strong incentive for smuggling. The strength of farmers' demand,

^{1/} An exception is the relatively small amounts of AS, formerly imported by BADC and distributed by the Bangladesh Tea Association (B.T.A.) and now procured directly by the B.T.A. from the Fenchuganj factory.

while supplies have been disrupted by the war of independence, has led to the emergence of an active black market in fertilizers where farmers pay two or three times the official price. The transportation system was seriously disrupted during the war, with great losses to the vehicle fleet and the destruction of vital bridges. There appear to be weak links within the distribution system itself. As a consequence of all these factors, farmers frequently complain that fertilizers are not available when they want them.

5. The present problems in marketing and distribution, combined with the need to develop a system capable of distributing much greater quantities of fertilizer in the future, has led the government to undertake a comprehensive fertilizer marketing and distribution study. The main objective of the study is to propose institutional, organizational and policy changes and improvements and to identify investment needs in fertilizer distribution. The first phase of this study, undertaken with technical assistance from the Tennessee Valley Authority (TVA) and financed by USAID, began in April 1974. Annex 3 contains the terms of reference for this study. Among its tasks are the identification of investment projects and preparation of detailed terms of reference for a second phase study which would produce detailed feasibility and pre-appraisal reports for the projects, suitable for financing by external donors. The study should shed light on a number of problem areas including:

- a. Bagging and handling methods: Current practice of using jute bags with polythene liners is expensive but it appears to protect the fertilizer fairly well through the rough handling it receives on its way to the farmer. Alternative bagging materials are much less costly than jute, and if handling operations are improved, could result in savings. Other possibilities to reduce bagging costs would include reusing the jute bags or charging farmers for the cost of the bags.
- b. Transportation: Using the results of the Bangladesh Transport Survey undertaken by the Economist Intelligence Unit, U.K. the TVA study will attempt to develop recommendations for the most efficient means of moving the fertilizer from ports and factories to the Thana level. The study will also indicate whether and at what stages fertilizer should be handled in bulk rather than bagged and which components of the distribution system need additional transportation capacity.
- c. Storage: To accommodate the anticipated growth in fertilizer use decisions will have to be made soon about the location and amount of storage capacity which may be necessary. Table 1 (at the end of this annex) provides data on the amount of storage owned or rented by BADC at the present time. While the aggregate amount of storage may appear sufficient for the next few years, storage capacity is presently poorly distributed and a careful review of storage requirements by specific

location and level of distribution is needed. For example, there would appear to be little need for renting more than 10,000 tons of storage capacity in Faridpur, a district whose total sales were under 7,000 tons in 1973.

- d. Linkages between supply - wholesale - retail operations: A number of problems exist in the linkages of the distribution system. For example, in those areas where TCCAs operate as wholesale agents they frequently do not receive the bank guarantee necessary for purchasing fertilizer on credit from BADC at the appropriate time. Also they delay placing their orders with BADC in order to minimize their interest charges. As a result, fertilizer is often not ordered early enough to reach the farmer's field at the right time. Another problem has been the low retail commission which, combined with the small average volume of sales, meant a gross revenue for the average dealer of less than Tk 600 in 1972/73. In April 1974, however, the commission was raised from Tk 10 per ton to Tk 60 per ton. Another complication inhibiting the flow of fertilizer to the farmers has been the "Priority List System" initiated in 1972 under which the Union Agricultural Assistant (the local level extension agent) drew up a list of which farmers could buy fertilizer and how much. The list was then to be reviewed by a Thana Agricultural Committee, chaired by the local Member of Parliament and allocations made to dealers, each of whom was to be instructed on how much fertilizer each farmer could buy. The system had potential for abuse and introduced rigidities in the system which resulted in significant shortfalls in the amount of fertilizer distributed in the Fall of 1973. As a consequence the system was temporarily suspended for the 1974 winter and spring crops and the shortfalls began to disappear.

6. In addition to examining the specific problems of the fertilizer marketing and distribution system, the TVA study will also examine and make recommendations on such broader issues as fertilizer requirements and demand (discussed in Annex 1), fertilizer application practices and supply sources. The study will also investigate the areas of pricing policy and methods of sales promotion discussed in Section B and C below.

B. Pricing Policy

7. Official retail prices for fertilizer have been highly subsidized in Bangladesh. In the last half of 1973 these subsidies amounted to about 19 percent for urea, 57 percent for TSP and 55 percent for MP₀ (see following Table). The strength and resilience of fertilizer demand during recent years calls into question the need to continue fertilizer subsidies. The fertilizer shortages, combined with the subsidies, have encouraged smuggling fertilizer into India and the development of a black market charging 2-3 times the official price. Farmers are already highly aware of the importance of fertilizer and they frequently have to pay far more than the full cost price on the black market. In addition, there is concern that it is the more economically and politically influential farmers who reap the most benefit from the subsidies. Therefore, the removal of these

subsidies should neither dampen fertilizer demand significantly nor cause undue hardship to the poorer farmers, particularly if rice prices remain near present levels and if credit institutions are improved. Moreover, the present subsidies can lead to misallocation of fertilizer both among areas and among crops. Accordingly, the Government has begun to eliminate these subsidies on a phased basis over the next five years. Initially, however, as a result of stiff political opposition to this policy, the phased reduction has been delayed somewhat. As a result, the Government was receiving substantially less than planned from fertilizer sales during 1973/74.

8. World market prices for fertilizer rose dramatically during 1973 and early 1974, increasing the costs of providing fertilizer to farmers. The selling price, however, remained fixed, leading to a rapid increase in the subsidy and a major drain on financial resources. To offset this development, in April 1974 the Government raised the prices of urea, TSP and MP by 67%, 100% and 100% respectively. The new urea price more than covers the delivered cost of locally produced urea (indeed it includes a 16% surplus), but it is about 38% below costs for imported urea prevailing in early 1974. The new TSP price implies a 60% subsidy and the new MP price a 40% subsidy. For imported urea and TSP the net effect of the increases in both world market prices and selling prices to the farmers is a major increase in the absolute size of the subsidy per unit of fertilizer. For MP, the amount of subsidy per unit is about the same as before the price increase. The surplus gained by the Government from sales of locally produced urea will partially offset the losses on the other types of fertilizer. The following table summarizes the recent changes in pricing policy.

Bangladesh - Prices and Costs^{a/} of Fertilizer at Farmer Level
(in Tk/md.)^{b/}

	<u>July 1973</u>			<u>April 1974</u>		
	<u>Cost</u>	<u>Sales Price</u>	<u>Subsidy</u>	<u>Cost</u>	<u>Sales Price</u>	<u>Subsidy</u>
<u>Urea:</u>						
Local				42	50	-8
Imported				80	50	30
Average	37	30	7			
<u>TSP</u>	47	20	27	101	40	61
<u>MP</u>	33	15	18	50	30	20

a/ Including marketing and distribution costs. C.I.F. fertilizer prices were fluctuating widely in the first half of 1974 hence the cost data, based on fragmentary market information, must be regarded as highly temporary.

b/ The above figures can be converted to dollars per metric ton by multiplying them by a factor of 3.577 (or 2205 lbs/metric ton ÷ 82.2 lbs per maund ÷ 7.5 taka per dollar).

9. The increase in fertilizer prices was a necessary step, but it is difficult to see the rationale for the structure of the price increases. The new prices, in effect, tax urea to subsidize TSP and MP. Moreover, the absolute size of the subsidy for fertilizers may grow, depending both on the mix of fertilizers consumed by the farmers (particularly on how much TSP is used) and on whether urea imports are necessary. Given the volatility of the world market for fertilizers, it is difficult to determine what pricing policies Bangladesh should follow to balance the current, short term, high fertilizer prices against the longer term fertilizer prices which may be substantially lower. It is clear that the Government's financial position does not allow it to continue to sell fertilizer at a loss indefinitely. All of this suggests the necessity of a careful review of fertilizer pricing policy.

C. Sales Promotion, Extension and Credit

10. Fertilizer dealers have in the past several years faced a seller's market. With demand for fertilizers exceeding supply, little effort was required to sell available stocks. With fertilizer use so low, the marginal increase in output from using fertilizers was very high to the farmers. This, combined with high and rising rice prices and the introduction of new, more fertilizer-responsive, high-yielding varieties, has kept demand growing at a brisk pace. In the future, supplies of fertilizer, particularly urea, are likely to be in better balance with demand. Moreover, growth in demand for fertilizer may slow down as farmers increase their dosages to levels closer to, but still well below, their economic optimum. This may happen because the farmer does not know what the economically optimum dose for his use is, because the farmer is unwilling to take greater risks for smaller marginal gains in the face of great uncertainty about floods, droughts and crop prices, and because the farmer is unwilling to bear the greater financial burden implied by the higher doses. All this implies is that it may become more and more difficult in the future to get farmers to use the fertilizers needed to keep agricultural production growing.

11. Sales promotion activities in their broadest sense will, therefore, be increasingly necessary. As noted above, the relatively small commission earned by the average dealer is not likely to cause him to undertake any major promotion effort. (Although the commission has been raised from Tk 40 to Tk 60 per ton, in view of the parallel increase in fertilizer prices, the retailer's commission has fallen in percentage terms.) The present system, however, has the important advantages of bringing fertilizer almost to the farmer's doorstep and of selling fertilizers in the tiny quantities desired by small farmers.

12. Before the fertilizer dealers, or even the extension agents (Union Agricultural Assistants or UAA's), can encourage farmers to use more fertilizer or increase the proportion of P and K nutrients in the fertilizer mix farmers use, they first must have some better notion of the economically optimal fertilizer doses. As suggested above, most farmers view the present recommended doses as unrealistically high. The recommendations are based on field trials carried out in ways which make it impossible to determine economically optimal doses or the independent effects, over a range of doses, of the different major nutrients (N, P and K). Moreover, they take no account of the changing relationship between crop prices and fertilizer prices, of the risk and uncertainty

faced by the farmer, or of the considerable variations which exist in different parts of the country. Nor do the recommendations offer much advice as to when and how to apply the fertilizer. A necessary first step would be to review past fertilizer trial data and begin a new series of trials designed to provide information more meaningful for the farmers' needs. Dual purpose fertilizer trial/demonstration plots could produce the data needed and show farmers the results at the same time. Armed with such information - conveyed either in a short course or through simple written instructions - the fertilizer dealer could encourage greater fertilizer use based on sound technical advice.

13. The existing channels of conveying technical information to the farmers - the extension services and the farmer training programs at the Thana Training and Development Centers - should play a major role in carrying the results of the fertilizer trials and other technological improvements to the farmers. Indeed, these channels could themselves, in coordination with the relevant research institutions organize and carry out the trials and demonstrations. The extension service and the farmer training programs currently have serious weaknesses, however, which preclude relying strongly on them in the short term.

14. At present the main extension network consists of some 4,000 extension workers (Union Agricultural Assistants or UAA's) posted at the Union level ^{1/}. They are the only development officers posted at that low an administrative level. Their training includes a secondary school pass and perhaps some training at an Agricultural Extension Training Institute. They are each responsible for the agricultural output of over 5,000 acres and for some 1,700 farm families. They are expected to be knowledgeable about the many varieties of the many crops grown, the latest improvements in cultivation practices, fertilizer doses, pesticides and their use, fisheries, livestock and irrigation. At the same time they are supposed to meet production targets, gather statistics, help with the census, assist in relief work and do anything else that comes to mind. There have been proposals that it is not appropriate for UAA's to be so narrowly focussed on agriculture and that they should take on additional responsibilities such as health and family planning as well. This is a lot to ask of a man who is poorly trained, is one of the lowest paid government officers, has no housing (which in the traditional muslim rural setting seriously limits his ability to visit villages), and is offered virtually no hope of promotion. Small wonder that farmers report seeing their UAA less than twice a year. At the Thana level there is a wide variety of agricultural personnel, ^{2/} but their actual training is not much better than the UAAs' and their ability to reach farmers is probably less. Fortunately, farmers seem to be able to adopt major agricultural improvements without much help from the extension service. But, as refinements in agricultural technology become more complex, farmers will need greater technical assistance.

15. Farmer training at Thana headquarters in Thana Training and Development Centers (TTDC) is another method used to convey technical information to farmers. First developed in Comilla district, it was shown there to have considerable potential. Under this system, selected model farmers come to Thana headquarters

^{1/} There are other extension-type activities carried out under a number of area specific and/or crop specific programs. They have many of the same problems as the UAA's, plus some of their own.

^{2/} Including the Thana Agricultural Officer, the Thana Cooperative Officer, the IRDP Project Officer, the BADC Irrigation Officer, the Plant Protection Officer, and many more.

periodically to be instructed in new techniques. They then are expected to pass this information on to others in their communities. Unfortunately, overly rapid expansion combined with the disruptive events of the past several years have caused serious deterioration in this program. New teaching materials have not been developed. There is little control over the content of the courses as they are often put together on an ad hoc basis depending on which Thana agricultural officer happens to be available. The TTDC buildings are sometimes diverted to other uses. Small wonder farmers now appear more interested in collecting their travel allowances than in hearing the same outdated talks time and again. An FAO/IBRD cooperative program mission began in April 1974 to prepare a rural development education and training project designed to strengthen the programs for bringing information to the farmers. Appraisal of this project is expected to take place in July 1974.

16. An effective system of agricultural credit, capable of providing farmers with timely finance at reasonable interest rates, could ease the financial burden for farmers of increasing the intensity of fertilizer use. Unfortunately, institutional (i.e., government/cooperative) agricultural credit in Bangladesh suffers from serious limitations at the present time. Agricultural credit in Bangladesh has been the subject of a special sector mission whose findings are incorporated in a working paper.^{1/} A brief review of the agricultural credit situation indicates: (a) the present agricultural credit institutions are, for the most part, in severe financial trouble; recovery rates (which are very low) reveal only part of the problem, for since independence, nearly half of short-term debt sanctioned has been converted by the Bangladesh Bank to medium-term debt, so the Government would not have to bear the financial burden of carrying out its obligation to guarantee the loss; (b) at the same time no parallel debt rescheduling is being carried out at the farm level and recovery of old debt is not improving; (c) no provision is made in the revenue budget to guarantee the large volume of lending proposed under the Plan; (d) the interest rates on agricultural loans are artificially low and do not reflect the cost of capital, including the administrative costs of the credit system, and an allowance for the risks in lending to farmers; (e) the credit institutions have not played a significant role in mobilizing rural savings and resources; and (f) while many of these problems have been intensified by the severe hardships of the past three years (and by doubt in farmer's minds as to their liability for debts incurred before independence), the problems will remain for several years to come.

17. The rapid expansion of credit called for in the First Five-Year Plan would seem inappropriate in the current situation. For reasons of both finance and implementation capacity, a slower, more careful pace of credit expansion is indicated. While viable credit institutions may make it easier to modernize agriculture, the inability of agricultural credit institutions to expand at the pace proposed in the Plan may not be a serious impediment to agricultural development in Bangladesh. Comprehensive, recent nationwide data on agricultural credit and rural debt do not exist, but some recent fragmentary data, summarized in Table 2 at the end of this annex, suggest some interesting points. First, institutional credit provides only a small portion of the average farmer's borrowings. Several studies have indicated that farmers in Bangladesh obtain only about 10 - 15 per cent of their borrowings from institutional (governmental/cooperative) sources.

^{1/} IBRD, Bangladesh Agricultural Credit Review. It is expected that this report will initiate a dialogue between the Government and the Bank, leading perhaps to IDA assistance in the field of agricultural credit.

The largest single source of credit is relatives and friends (52 percent). Money lenders provide some 30 percent of the credit. Second, less than 5 percent of a farmer's short-term borrowings is used to purchase agricultural inputs. The rest is used for consumption and other purposes. The funds provided by agricultural credit institutions are often not used for agriculture. Third, only a small part (about 14 percent) of fertilizer purchases are financed by credit. All this suggest a fairly weak link between the present institutional credit system and the needs of agricultural development.^{1/}

18. In spite of grave weaknesses in agricultural credit institutions, Bangladesh farmers have rapidly increased their use of both fertilizer and HYV seed. These inputs have apparently been financed largely out of the farmer's own resources, from sale of small portions of his crop or from income earned in subsidiary occupations. This suggests that at least the initial phases of adoption of the seed-fertilizer technology can begin even to use high-yielding seeds and fertilizer, but there is no solid evidence that small farmers have lagged in the adoption of new technology.^{2/} Moreover, the mere expansion of credit flows through existing institutions, which tend to be dominated by the larger farmers, is not likely to have the desired effect. This is not to say that an effective credit system would not be a major asset to agricultural progress, but it does say that mere expansion of the present system may not yield much return. The implication is that what is called for is a much slower rate of expansion combined with greater efforts to improve the quality of the existing institutions.

19. The limitations of the present extension services and credit institutions are a source of serious concern in Bangladesh and various proposals are under consideration for strengthening them. It is not likely, however, that the weaknesses of these organizations will prove to be a serious constraint in using the output of the proposed urea factory and the demand projections in Annex 1 reflect fully the known limitations of these services. Current fertilizer use is now so low that farmers are a long way from optimum levels. Farmer-to-farmer transfers of information and HYV seeds have done much to spread technological improvements in spite of the limitations of the extension service. In the absence of effective institutional credit, traditional sources of finances such as friends, relatives and money lenders are likely to continue to play a significant role in financing those farmers requiring credit to purchase fertilizers.

South Asia Department
July 1974

^{1/} The Master Survey of Agriculture, No. 9, p. 33, indicates that in 1967/68 farmers with less than 2.5 acres used 35 percent more fertilizer per acre than did larger farmers.

^{2/} State Bank of Pakistan, 1966; Barisal Agro-Economic Survey, 1972.

**DISTRICT-WISE LOCATION OF FERTILIZER GODOWNS
DEPARTMENTAL & NIBED & NO. OF APPROVED DEALERS
AS ON DATE 1.12.77
(Capacity in Tons)**

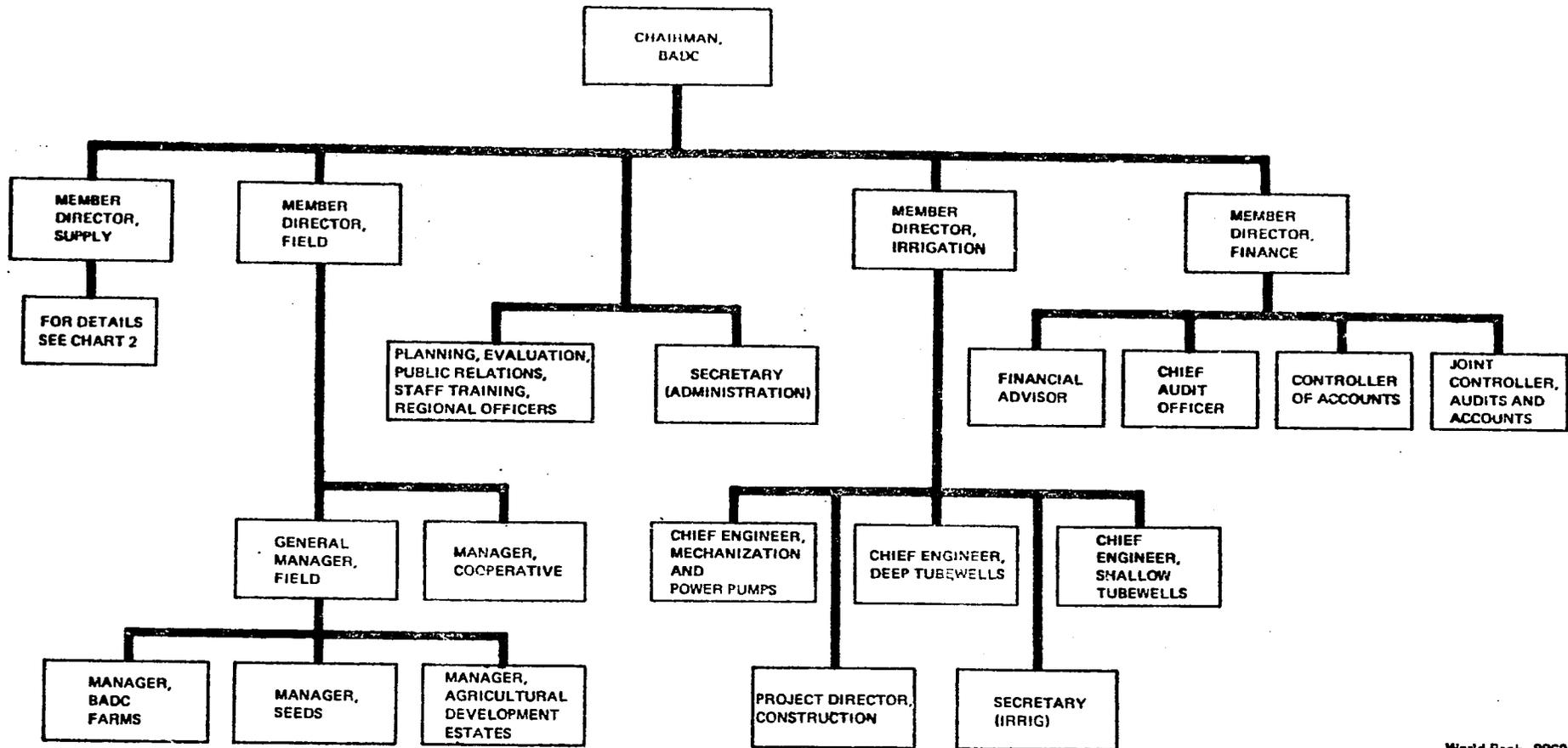
Name of District	NIBED'S OWN GODOWNS						T.N.A.R.A.				NIBED GODOWNS						No. of Approved Dealers for 1978-79						
	Transfr No.	Capacity	Big (2,000) No.	Capacity	Big (1,000) No.	Capacity	Int. (500) No.	Capacity	No.	Capacity	200 Tons No.	Capacity	Int. Godowns No.	Capacity	Big Godowns No.	Capacity		Int. Godowns No.	Capacity	Thana Godowns No.	Capacity	Total Storage Capacity	
1. Barua	-	-	-	-	-	-	4	2,000	6	2,400	9	1,800	-	-	8	6,727	9	4,353	69	8,426	100	25,883	4,874
2. Tangail	-	-	-	-	1	1,000	-	-	-	-	5	1,000	-	-	-	-	-	-	7	-	13	3,711	474
3. Kishoreganj	-	-	1	2,000	1	1,000	-	-	-	5	2,000	6	1,200	-	-	-	-	-	-	-	-	-	-
4. Mymensingh	-	-	1	2,000	1	1,000	1	500	3	1,200	11	2,200	-	-	2	4,776.90	-	-	57	7,620.10	72	18,595	1,928
5. Faridpur	-	-	-	-	-	-	2	100	-	-	5	1,000	-	-	4	7,000	2	1,000	35	5,456	56	20,336	1,731
6. Chittagong	-	-	2	4,000	4	4,000	3	1,500	3	1,200	16	2,200	-	-	3	6,087	2	1,100	28	2,526	60	11,711	871
7. Comilla	-	-	-	-	3	3,000	3	1,500	5	2,000	10	2,000	-	-	3	5,793	4	2,600	32	5,827	69	27,320	3,790
8. Noakhali	-	-	-	-	-	-	2	1,000	4	1,600	6	1,200	-	-	-	-	2	700	5	1,173	27	10,373	3,524
9. Sylhet	-	-	-	-	2	2,000	-	-	1	400	7	1,600	-	-	-	-	-	-	40	5,143	54	10,863	1,888
10. Chittagong H.Y.	-	-	-	-	-	-	1	500	-	-	6	1,200	-	-	-	-	-	-	78	6,361	88	10,161	943
11. Rajshahi	-	-	-	-	1	1,000	1	500	4	1,600	13	2,600	-	-	-	-	1	450	17	684	25	2,834	316
12. Pabna	-	-	-	-	-	-	3	1,500	2	800	7	1,400	-	-	-	-	4	2,430	51	7,105	74	15,235	1,089
13. Rangpur	-	-	-	-	1	1,000	1	500	5	2,000	17	3,400	-	-	-	-	1	550	24	4,261	37	8,511	870
14. Dinajpur	-	-	1	2,000	1	1,000	3	1,500	4	1,600	10	2,000	-	-	-	-	2	1,150	38	7,047	64	15,897	1,616
15. Bogra	-	-	-	-	2	2,000	1	500	5	2,000	6	1,200	-	-	-	-	2	1,000	41	7,540	62	16,640	839
16. Khulna	-	-	2	4,000	2	-	2	1,000	3	1,200	10	2,000	-	-	4	4,750	3	2,000	22	2,695	43	15,145	731
17. Jessore	-	-	-	-	2	2,000	1	500	1	400	6	1,200	-	-	1	1,000	2	1,000	17	1,933	37	12,153	470
18. Kushtia	-	-	-	-	2	2,000	1	500	2	800	8	1,600	-	-	-	-	1	734	67	7,728	78	12,562	904
19. Feni	-	-	-	-	-	-	-	-	-	-	1	200	-	-	-	-	2	1,050	18	2,684	23	8,434	680
20. Bakerganj	-	-	-	-	1	1,000	2	1,000	3	1,200	5	1,000	-	-	-	-	-	-	19	2,102	28	2,300	304
Sub-Total	-	-	7	14,000	21	22,000	31	15,500	56	22,400	164	32,800	-	-	22	36,131.90	39	21,999	704	93,300.10	1,045	258,131	26,790
21. Dy. M. (Govt) Khulna	1	7,000	-	-	2	2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	9,500	-
22. Dy. M. (Ship) Chittagong	3	24,500	-	-	-	-	-	-	-	-	-	-	17	10,243.23	-	-	-	-	-	-	20	24,743	-
23. M.O. (M. Govt.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,000	-	-	-	-	1	1,000	-
Total	4	32,000	7	14,000	24	24,000	31	15,500	56	22,400	164	32,800	17	10,243.23	23	37,131.90	39	21,999	704	93,300.10	1,049	303,374	-

BANGLADESH - ASHUGANJ FERTILIZER PROJECT
RURAL CREDIT BY PURPOSE AND SOURCE: BARISAL, 19
(in Taka)

	INSTITUTIONAL CREDIT			MONEYLENDERS/TRADERS			FRIENDS, RELATIVES, OTHERS			TOTAL		
	Short Term	Medium and Long Term	Total	Short Term	Medium and Long Term	Total	Short Term	Medium and Long Term	Total	Short Term	Medium and Long Term	Total
For Fertilizer	14,264	0	14,264	875	0	875	1,340	0	1,340	16,479	0	16,479
For Seed and Pesticides	11,362	0	11,362	5,550	0	5,330	15,200	0	15,200	51,892	0	51,892
Other Use	133,540	38,490	172,030	424,285	71,985	496,270	674,594	61,360	735,954	1,232,419	171,835	1,404,254
Total Borrowing	159,166	38,490	197,656	430,494	71,985	502,475	691,134	61,360	752,494	1,280,790	171,835	1,452,625

SOURCE: Barisal Argo Economic Survey, 1972. Data refer to four Thanas in Bakerganj District. Total use of fertilizer, including farm yard manure and oil cake, was valued at Tk. 114, 847. Total credit for fertilizer (Tk. 16,479), was sufficient to finance only 14% of this.

**GENERAL ORGANIZATION CHART OF THE
BANGLADESH AGRICULTURAL DEVELOPMENT
CORPORATION**



BANGLADESH - ASHUGANJ FERTILIZER PROJECTSCOPE OF WORK AND TERMS OF REFERENCE (PHASE I) FOR
TVA/GOVERNMENT OF BANGLADESH FERTILIZER MARKETING
AND DISTRIBUTION STUDY (MARCH 1974)A. Terms of Reference and Scope of Work

A team consisting of four TVA and an equal number of Bangladesh technicians will:

1. Review available agronomic data to determine the adequacy of present fertilizer recommendations by crops and regions.
2. Make fertilizer use estimates by crop, region and by season of demand (irrigated and non-irrigated) for five and ten year periods and provide methodology for updating annually.
3. Recommend kinds and quantities of fertilizer (urea, straight phosphates, N-P, N-P-K, and possible micro-nutrients) best suited to Bangladesh agriculture.
4. Evaluate the possible use of rock phosphate in Bangladesh agriculture and crops in which it could be used and the price at which it could replace TSP or other manufactured phosphates.
5. Recommend possible needs for liming materials or other amendments and how needs can be satisfied.
6. Produce regional fertilizer needs (total and by kind) and recommend date of arrival at regional godowns, so that fertilizers will be available for moving through the system on a timely basis. In order to assess future transportation requirements, the study will make recommendations concerning not only the areas of fertilizer usage but also the points within the country from where the fertilizer will be supplied whether locally manufactured or imported. Provide a methodology for updating this annually.
7. Review and estimate a local fertilizer production capability. Recommend kinds and amounts of fertilizer that should be produced in Bangladesh over the years ahead.
8. Recommend imports needs (amounts and kinds) to supplement local production and better serve agricultural needs. Suggest tendering procedures and import schedules.
9. Evaluate the potential for bulk handling for imported and locally produced fertilizers and provide guidance on types of equipment and handling facilities needed. Advise on most suitable size and type bags for transport and delivery of fertilizer (especially urea) under the conditions prevailing in Bangladesh.

10. Study present storage facilities and plans for expansion as to adequacy and in light of good inventory management.

11. Provide guidance on how present production can be utilized to provide fertilizer needs and suggest alterations of existing facilities to contribute to meeting this need.

12. Determine probable value/cost ratios and utilize these to derive priorities for fertilizer use in a sellers market situation and as a guide for the reduction or elimination of subsidies.

13. Study the present pricing policies and suggest future policies.

14. Study the present credit system to ascertain effect on fertilizer sale and suggest improvements based on estimated future requirements.

15. Utilize data generated by the transport survey and build on this to provide a transport strategy and system for fertilizer, identifying where possible, specific projects required to meet transport system objectives.

16. Describe, evaluate and recommend improvement in the overall distribution and marketing system for fertilizers in Bangladesh.

17. Study the method of appointment and regulation of fertilizer distributors, wholesalers and retailers. Comment on past effectiveness, adequacy and suitability of marketing structure at Thana level and below, along with its commercial effectiveness. Identify weaknesses and propose options to the Government.

18. Observe workings of fertilizer retailing system at farm level and the extent of farmer education, demonstration or other training program. Identify weaknesses and propose options to the Government.

19. Evaluate present research, extension and training efforts and suggest further training in the U.S., other countries and Bangladesh that will be beneficial.

20. Work with the Fertilizer Corporation to:

(a) Identify spare parts inventory needs for operating fertilizer plants; suggest how these needs can be satisfied (what can be locally produced and what should be imported) and work out a system for continuous inventory control.

(b) Provide assistance in the establishment of preventative maintenance programs to assure a minimum of down time

and methods for predicting probable trouble areas so corrective measures can be taken rapidly during planned periodic down time.

(c) Work out a plan for training of key personnel in various aspects of operation, maintenance, instrumentation, water treatment, corrosion control, safety, etc.

(d) Plan and program a strategy for the utilization of existing facilities and supplementing them with new facilities to provide the full range of fertilizers needed by Bangladesh agriculture with special attention being given to N-P and N-P-K fertilizers at minimum cost and at minimum foreign exchange expenditure.

21. Examine the organization, responsibilities and authority of the BADC, and comment on its past and present effectiveness particularly with respect to importing and supplying adequate quantities of fertilizer when and where they are needed. Make suggestions and recommendations on the future function and operations of the corporation in the fertilizer field and on any improved practices and procedures it may usefully adopt in its forward planning, day to day operation, and in collecting and analyzing market information. Suggest the needs of any training program for the Corporation staff which should be instituted.

22. Prepare draft Terms of Reference for a Phase II Study consisting of a detailed feasibility study for the proposed investment projects and a program for institutional improvements identified in Phase I.

BANGLADESH: ASHUGANJ FERTILIZER PROJECT

PAST PERFORMANCE OF BFCPC FERTILIZER ENTERPRISES

1. The four major fertilizer works under the control of the BFCPC are the Ghorasal urea unit; the two triple superphosphate units at Chittagong; and the ammonium sulphate/urea unit at Fenchuganj.

A. The Ghorasal Urea Unit

2. The Ghorasal urea factory has a rated output of 1,137 MTD low biuret urea and was built by the Toyo Engineering Company under Japanese aid, with the Power Gas Corporation of the UK acting as the Corporation's technical advisor. The plant is based on total energy recovery centrifugal compressor type ammonia technology and was completed in mid-1970 and handed over in September after satisfactorily passing its performance tests. The plant is made up of a single train ammonia unit of 660 MTD capacity based on Power Gas's Methane/Steam reforming process and Toyo's own ammonia synthesis loop design. Carbon dioxide removal from the reformed gas stream is by the Gianmarco Vetrocoke system but additional carbon dioxide as needed for urea synthesis is extracted from flue gases using mono ethanolamine solution. The ammonia unit includes a 6,200 kW centrifugal air compressor supplied by IHI (Japan) driven by a Toshiba steam turbine, a 14,500 kW ammonia synthesis gas compressor built by Mitsubishi under license from Clarke (USA), driven by a Mitsubishi steam turbine, and a 6,600 kW IHI/Toshiba steam turbine driven centrifugal refrigeration compressor. Also included to supply the full power requirements of the works are two 8 MW gas turbine alternator sets with the gas turbines being supplied by Mitsui Shipbuilding and the alternators by Meidensha Electric Manufacturing Company. For emergency power standby two diesel generators of 500 kW each are provided. The two 8 MW gas turbine alternator sets have not fully realized their expected reliability. Consequently plans are in hand to draw a standby power supply from the grid which is expected to be shortly boosted by completion of a nearby power station.

3. The urea unit is based on Toyo's own total recycle process and is basically a single train unit although two urea reactors, two carbamate pumping streams and two crystallizer units are installed. Carbon dioxide is supplied from an IHI/Toshiba steam driven booster compressor of 4,000 kW capacity. The urea unit is reported to have given no trouble in operation.

4. The plant employs a total of around 1,100 persons and is under the control of a General Manager assisted by a Factory Manager who directly supervises the entire works organization which is split into eight departments -- Operations, Maintenance, Materials Planning, Finished Product Disposal, Construction, Administration, Accounts, and Power Supply. All labor employed in the works up to the level of "Shift Supervisor," (employees above this level are called "officers"), are controlled by the Sramic Federation of which membership is compulsory at a cost of some Tk 1 per month. The Sramic Federation has its head office in Dacca and covers

the unionization of nine Government Corporations -- Fertilizer, Shipbuilding, Paper and Board, Food and Allied Industries, Oil and Minerals, Cotton, Sugar, about half the Jute Corporation, and Shipping. Up till the present time there are no separate trades unions and all employees of these industries regardless of their trade belong to the Sramic Federation. The Federation does not second an official to each industry under its control but instead recognizes group officials which are appointed by workers in individual manufacturing units. The labor union is strong and worker demands are continually being made. Presently (March 1974) at Ghorasal the union is demanding increased salaries, better conditions, promotion after three years service and increased manning of plant units. In the latter respect significant increases in the manning of units involving water treatment, urea prilling, product finishing, ammonia and urea compression, power supply and laboratory are being demanded, all of which are being resisted by the management which points out that overstaffing of these units will lead to operating inefficiencies. In spite of the potentially critical labor situation, however, the Ghorasal factory has had only one strike since liberation in 1972. This was a 24-hour general strike called by the Sramic Federation on all industries under its control; during this period, the Ghorasal works was kept running by its officers.

5. The performance record of the works since being taken over from the contractor by the Corporation, however, has been poor. In October 1970 almost immediately after "take-over," a crack developed in the Waste Heat Boiler drain tube necessitating a two months' shut down of the entire works. Subsequently shortly after the plant was restarted in December 1970, due to bad control of the boiler feedwater treatment units, silica was deposited on the steam turbine blades which required a further two months' shut down of the entire works to permit cleaning and repairs. Shortly after the plant was restarted after this occurrence, the war of liberation intervened forcing it to shut down again.

6. After the war in June 1972 a team of experts from the Toyo Engineering Company returned to Ghorasal and set about cleaning out and restoring the plant after its long shut down and it was restarted in August 1972. Between then and June 1973, however, the plant suffered 10 shut downs of varying duration largely as a result of "fail safe" automatic instrumentation. Due to a lack of confidence in the capabilities of the available operators, automatic instrumentation had been set to shut down the plant at the first sign of unsafe or unstable conditions before major damage could occur, although during this period it has been conceded by the contractors that some shut downs were due to incorrectly functioning instruments. However, with increasing confidence in the operators to detect and correct minor malfunctions the sensitivity of the automatic shut-down devices has been reduced, largely eliminating the problem.

7. In June 1973, however, problems in the auxiliary boiler were encountered involving several burst superheater tubes and leading to another lengthy shut down, this time of 90 days' duration. The extraordinary length of time elapsing before restarting the plant was reported to be due to a lack

of the necessary skilled welders in Bangladesh to make repairs and the failure due to administrative bottlenecks to secure promptly the necessary technicians from Japan. The plant was finally restarted in August 1973 but problems with the boiler superheater tubes persisted ultimately requiring more than 10% of the tubes to be taken out of service thus severely limiting the output of the plant.

8. The plant appears now to be capable of running fairly consistently at an output of about 880 tons/day urea or about 78% of rated capacity. A major scheduled overhaul is planned for July 1974 which will take two months and after which it is hoped the plant will be able to achieve something like its full design output reasonably consistently. The reasons for the operating history of Ghorasal are hard to pinpoint. Some will be undoubtedly due to imperfection in design and construction, but the damage caused to the turbines and steam system due to faulty operation on the initial phase of the plant's life may have been a major contributor.

9. Mechanical problems, however, are not the only difficulties presently being encountered in the operation of the Ghorasal works. Lack of spare parts is becoming an even more critical factor. Due to a severe shortage of foreign exchange for the purchase of these spare parts, it has been reported that the suppliers will now only prepare a detailed quotation on receipt of a letter of assurance that the finance is available for their purchase. It is reported that such a letter which is issued by the Planning Commission at the request of the Corporation normally takes about one month. Following presentation of this letter a quotation is received which is valid for a limited period usually less than three months and an order made up from the quoted list is then compiled. Before the order is accepted, however, a letter of credit must be opened which is reported to take at least three months by which time the offer is invalid and a new quotation must be sought, requiring the entire procedure to be repeated. Again when spare parts are eventually delivered, clearance from customs at Chittagong is reported to take three to four months and from Dacca Airport, for those parts air-freighted in, between one and two months. If this situation regarding spare parts cannot be quickly remedied, therefore, it is unlikely that the Ghorasal works will achieve consistently high outputs in the foreseeable future, even after major mechanical problems have been largely overcome.

B. The Chittagong Triple Superphosphate Units

10. The two triple superphosphate works of the EFCEP are situated on the same site fronting the west bank of the Karnaphuli river at the Port of Chittagong. Raw materials phosphate rock and solid sulphur may be unloaded at the wharf immediately in front of the works site and conveyed by a short enclosed belt conveyor directly into works storage.

11. The first of the triple superphosphate units known as TSP-1, was completed in 1969. Originally, it had been intended to construct a single superphosphate works and a bidding competition for such a project had been won by a U.S. company "Technical Enterprises." Subsequently, however, it

was decided to change the project to TSP for which French aid funds had become available. A joint venture French-U.S. company known as Technique Chemie was therefore formed to execute the project incorporating Technical Enterprises which would supply the equipment and another company known as "Pan American" which would do the design. The "Chemico" process for both sulphuric acid and phosphoric acid was adopted and the design output of the plant was 100 MTD 98% sulphuric acid, 32 MTD phosphoric acid as P₂O₅, and 106 MTD TSP fertilizer.

12. Attempts were made to start TSP-1 in 1969 using Jordanian phosphate rock. The plant however had been designed to use either Moroccan or Florida rock and could not cope with the high fluoride, chloride and silica content of the substitute material. Consequently, severe corrosion took place in the phosphoric acid plant equipment and the works quickly had to be shut down for repairs. "Technical Enterprises" agreed to supply replacements for the corroded equipment items and some pieces were received in 1970, but before the balance of the items were received and the repairs could be effected, the war intervened. After the war, a new contract was made with Technical Enterprises and the remainder of the replacement equipment items was supplied by the end of 1973. Installation however has still not been undertaken because Technical Enterprises who are also responsible for this task do not wish to commence work until such time as the Corporation has secured supplies of suitable phosphate rock with which to restart the plant.

13. In this connection the Corporation had entered into a contract with the International Mining Corporation (IMC) for delivery of Florida rock in April 1973 but this contract was allowed to lapse due to difficulties arising from price increases due to the US dollar devaluation and freight cost increases. Meanwhile a new contract for supply of phosphate rock from Morocco was made in February 1974 under an arrangement whereby Bangladesh would make its own shipping provisions. So far however no such provisions are known to have been made and TSP-1 remains idle.

14. Prior to the completion of TSP-1 it was realized that considerably greater quantities of phosphate fertilizers would be needed and so in 1969 construction of TSP-2 was commenced by Hitachi of Japan on a turnkey basis financed by Japanese suppliers credits. The design capacity of the plant was 400 MTD 98% sulphuric acid, 133 MTD phosphoric acid as P₂O₅, and 430 MTD TSP. Phosphoric acid manufacture was based on the Nissan hemihydrate process and again required a phosphate rock raw material of limited chloride, fluoride and silica content.

15. The plant was completed in November 1970 but Hitachi would not agree to it being started on Jordanian rock which it was not designed to process. Consequently, the plant lay idle until the war came in August 1971 when slight damage was sustained. After the war in November 1972 another contract was made with Hitachi to return and repair and recondition the plant ready for start-up, and this work was in fact completed on time by March 1973. As in the case of TSP-1, however, no start-up has so far been possible due to a lack of suitable phosphate rock supplies.

C. The Fenchganj Ammonium Sulphate/Urea Unit

16. The first of the Corporation's four existing fertilizer manufacturing units was set up at Fenchganj (about 12 miles south of Sylhet) in 1961. The plant had a design capacity of 106,000 MTY urea with about 12,000 MTY by product ammonium sulphate and took its supply of raw material from the Haripur gas field. This plant was based on conventional reciprocating compressor ammonia technology and a partial recycle urea process. It is reported to have operated satisfactorily over the years 1962 to 1970 achieving an average annual output over the period of 87% of rated capacity. Although reportedly suffering no damage it was shut down during the war and after restarting failed to achieve its previous performance, production steadily dropping to 35,911 tons urea in the year 1972/73, or about 32% of rated capacity. It is expected, however, that the works will shortly undergo a thorough overhaul.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

THE BANGLADESH FERTILIZER, CHEMICAL
AND PHARMACEUTICAL CORPORATION

A. Legal Status

1. The Bangladesh Fertilizer, Chemical and Pharmaceutical Corporation (BFCPC), is a corporate body with power to acquire, hold and dispose of property. It was established in March 1972 by the Bangladesh Industrial Enterprises (Nationalisation) Order 1972, (President's Order No. 27 of 1972). Pursuant to this Order, the Government of the People's Republic of Bangladesh (the Government) acquired many industrial enterprises and created several "sector" corporations, including BFCPC, whose function is to control, supervise and coordinate the activities of those nationalized industrial enterprises, grouped by sectors, as were placed under each sector corporation by the 1972 Order and by subsequent Orders. The BFCPC exercises significant control over the day to day operations of many of the enterprises placed under it, including fertilizer enterprises. The Government has placed a total of 52 enterprises under BFCPC, including three fertilizer plants, nine chemical enterprises and four pharmaceutical enterprises. The fertilizer plants were taken over from the former East Pakistan Industrial Development Corporation. The nine chemical enterprises were abandoned by their previous Pakistani owners. Of the four pharmaceutical enterprises, three represent joint ventures, two with foreign companies.
2. The general direction and administration of BFCPC is vested in a Board of Directors appointed by the Government. The Board is subject to the supervision and control of the Government and must be guided by instructions given by the Government (usually the Ministry of Industry). The Board consists of a chairman and not more than six directors. The chairman is the chief executive of BFCPC.
3. BFCPC has an authorized share capital of Tk 10 million, subscribed by the Government of which an initial share capital of Tk 50,000 has been fully paid. An Annual Budget Statement must be submitted by BFCPC to the Government for its approval, following which BFCPC may spend such sums as it thinks fit on the basis of the Annual Budget Statement. BFCPC can, with the prior approval of the Government, borrow money, either with or without security, to discharge its functions.
4. BFCPC is required to maintain proper accounts, to prepare annual statements of account (including a profit and loss statement and balance sheet) and to submit these accounts to audit by two chartered accountants appointed by the Government. In addition, the Constitution of Bangladesh requires that BFCPC's accounts be audited by the Government Auditor-General.
5. The Government may, at its discretion, transfer to BFCPC any property, assets and liabilities, offices and employees belonging to or employed by the Government on terms and conditions determined by the Government.

B. BFCPC Organization

6. The organization chart of BFCPC is shown in Chart 1. At present there are five board members, including the chairman. The Board of Directors of BFCPC is an operating board. That is, each board member, including the chairman, is either the Operating Director (e.g. chief executive officer) for a group of enterprises or the Staff Director for a major corporate staff function. Presently, there are two such staff functions under a Director. These are finance and planning. The authority of the Directors for these two staff functions cuts across all the enterprises under BFCPC. The Finance Director for instance, has auditing, accounting and financial authority and responsibility for all enterprises as well as the corporate accounts. In a sense, therefore, only the administrative and production authority and responsibility is vested in an Operating Director.

7. At the moment, there are three Operating Directors, including the chairman. Similar enterprises under an Operating Director are grouped into Divisions, headed by a Senior Executive Officer. For example, the three existing fertilizer factories (a fourth one has been abandoned) form the Fertilizer Division. At present, there are seven Operating Divisions.

8. There are also seven staff divisions, two under the Planning Director and three under the Finance Director. The other two, the Purchasing and Sales Policy Divisions, are presently under the responsibility of an Operating Director. Presumably, as the Board is increased to its maximum membership of six, the sixth Director will have responsibility for one or both of these remaining staff divisions. Alternatively, there could be some rearrangement of responsibilities among the Operating Directors.

9. The BFCPC corporate organization currently has 548 employees, of which 133 are officers.

10. Each enterprise or plant is headed by a General Manager who reports to the Division Senior Executive Officer. The General Manager has administrative and production responsibility for the enterprise. The Chief Accountant for the enterprise is functionally under the authority of the Accounts Division (Comptroller) of BFCPC which, in turn, is under the Finance Director.

C. Financial Management

11. The corporate organization, as well as each enterprise has its own set of accounts. By law, the corporate accounts must be audited by external (private) auditors and the Government Auditor-General. In addition, the internal corporate Audit Division audits the corporate accounts.

12. The enterprise accounts are audited by external auditors and by the corporate Audit Division.

13. For simplicity, the two major accounts of an enterprise will be considered. These are the Sales or Revenue Account and the Current Account. All revenue collections, either by the enterprise or by the corporate Accounts Division on behalf of the enterprise, are deposited into the enterprise Revenue Account. However, only the corporate Accounts Division or Finance Director can authorize the withdrawal of funds from the enterprise Revenue Account.

14. The enterprise withdraws funds from its Current Account to meet its cash payments. This Current Account is replenished by transfers from the Revenue Account as authorized by the Finance Director or corporate Accounts Division.

15. There are very limited investment uses for cash surpluses of an enterprise. These are (a) short-term bank deposits at about 4% interest, (b) fixed deposits carrying about 6-7% interest, (c) loans to other BFCPC enterprises also at about 6% interest, and (d) capital investments such as plant modernization and staff housing. Loans from one BFCPC enterprise to another must be approved by the Finance Director and the Chairman of the Board.

16. The corporation has an authorized maximum line of credit from the banking sector of about Tk 50 million. In addition, it can borrow short-term funds from the Government. In general, a cash deficient enterprise can defer its interest payment obligation on the government equity (or loan).^{1/}

D. Operating Budgets and Foreign Exchange Allocation

17. The annual operating budget of the corporate unit is determined by the Board and approved by the Ministry of Industries. The annual operating budget of the enterprises must be approved by the Board only. The budget covers both the revenues and expenses (including both foreign exchange and local currency) associated with the projected level of operations. The corporation submits its annual foreign exchange requirement (for raw materials, spare parts or new equipment) to the Government (Ministry of Industry). The Cabinet decides on the foreign exchange allocations for the different ministries and government corporations. These foreign exchange allocations involve both free foreign currency (cash) and aid or grant type foreign exchange. The foreign exchange allocations are determined every six months, within the framework of the annual budgets.

18. The BFCPC corporate entity allocates its own foreign exchange allocation among the enterprises under its responsibility.

E. Purchasing Procedures^{2/}

19. For the enterprises that were originally under the defunct

^{1/} All enterprises, including the corporate unit, pay interest of about 6% on the government equity (sometimes treated as loans) in the enterprise or corporation.

^{2/} Items to be purchased as provided in the operating budget.

BIDC^{1/} the procurement of foreign raw materials is the responsibility of the Corporate Purchasing Division. All enterprises submit their foreign raw material requirements to the Purchasing Division at least six months before the materials are needed. Tenders for foreign raw materials are generally advertised in the local papers. Thus, local trading firms or local representatives of foreign firms actually arrange for the foreign purchase and shipment.

20. All purchases of local materials and the procurement of spare parts and equipment are processed by the enterprise. For all types of procurement, however, (local, foreign by BFCPC or by the enterprise) a cabinet sub-committee on tenders must approve the recommended winning bid if the procurement exceeds Tk 100,000. For purchases below this level, only BFCPC Board approval is required.

21. The abandoned enterprises acquired by BFCPC have more purchasing independence. These firms process and evaluate tenders, whether for foreign or local procurement. However, for purchases exceeding Tk 100,000, the BFCPC Board must approve the winning bid.

F. Personnel Recruitment and Salaries

22. The general manager of an enterprise has full authority to appoint factory workers. However, the officers of an enterprise are interviewed and appointed by a BFCPC interviewing committee. The appointment is made under the name of the general manager.

23. Most enterprise employees are paid on a monthly basis. Thus, the wages of factory workers are a fixed enterprise cost, rather than a variable cost. In general, the finished goods handling (loading for shipment) are contracted on a piece rate basis and is the only piece rate work in a factory.

24. It has been a tradition in the country that employees receive a one-month salary bonus, in addition to housing, medical and transport allowances.

25. To encourage increased plant production, production bonus systems have been adopted by all enterprises. The scheme generally specifies a certain percentage of the monthly wage as a bonus for each 1% production above some minimum level. This minimum level varies among the enterprises, depending on the vintage of the equipment and similar considerations. These bonus schemes have been designed so that the traditional monthly bonus has been worked into the system. Consequently, the minimum output level at which the bonus computation is based is very low, ranging from 25% to 60% of rated capacity (generally taken as 300 stream days for continuous process chemical enterprises). The scheme is also designed so that the equivalent of 2 months salary is provided as bonus upon reaching 90% to 100% of rated capacity.

^{1/} Bangladesh Industrial Development Corporation. The present BFCPC replaced BIDC. In addition, BFCPC also acquired those private firms abandoned by their owners after the war.

G. The BFCPC Overhead Allocation

26. BFCPC charges each enterprise an overhead allocation to cover the BFCPC administrative expenses. The basis for the overhead allocation charge is the original installed cost of the existing fixed assets (including all capital additions) of the enterprise. Thus, capital intensive and newer enterprises absorb most of the BFCPC overhead charges. For example, the Ghorasal Fertilizer Plant overhead allocation represented 1/3 of the Tk 6 million total overhead charges collected by BFCPC for the fiscal year 1972/73.

H. The Financial and Cost Structure of BFCPC

27. The government equity in BFCPC is Tk 0.5 million while liabilities to banks and other creditors amount to Tk 5.2 million. The "retained earnings" (excess of overhead charges collected from enterprises over expenses) is Tk 2.1 million. Obviously, overhead charges have exceeded operating costs. The Tk 2.1 million represent "profit" for the fiscal year 1972/73.

28. The current assets of BFCPC represent mostly advances and prepayments of Tk 1.0 million and Tk 0.73 million of cash deposits. The fixed assets represent Tk 5.5 million of ongoing projects kept as a corporate account, and Tk 0.52 million of existing fixed assets.

29. The fiscal year 1972/73 income statement of BFCPC is shown in Table 2. The expenses of BFCPC are mostly for salaries and benefits. For fiscal year 1972/73, total expenditures amounted to Tk 3.9 million, of which 6.4% was for taxes, interest and rent, 19.5% for non-salary (or benefit) expenses and 74.1% for salaries, bonuses and benefits.

I. Current Critical Operating Problems

30. The most critical operating problems at present are:

1. Labor productivity and discipline,
2. the shortage of foreign exchange,
3. the escalating prices and scarcity of foreign raw materials and spare parts.

Labor productivity is low, primarily due to over-employment and the inability of the factory management to enforce a satisfactory work discipline. The production bonus system was adopted primarily to motivate workers and apparently with some success in the Ghorasal Fertilizer Factory. The proposed project, with the creation of a new company (AFCC), is not expected to have labor problems. Sufficient spare parts for the factory are also provided in the capital cost estimate.

31. With the rapid increase in international prices, the budget and foreign exchange provisions for raw materials and spare parts purchases are severely insufficient. Furthermore, the non-availability of some materials have also contributed to low capacity utilization. In general, production requirements for a six month period are considered. This short horizon is probably dictated by foreign exchange constraint. Considering the scarcity of materials and the long procurement processing procedures, it is not surprising that there is significant plant downtime due to the non-availability of parts or raw materials.

J. The BFCPC Group of Enterprises

32. The table below summarizes the size of the operations by group of enterprises.

Table 1

<u>Enterprise Groups</u>	Ori- ginal Cost of Fixed Assets	(in Tk million)			
		<u>FY 1972/73 or June 30, 1973 Data</u>		Mgt.	Total
		Total Sales	Total Assets	Salaries & Allow.	Employ- ment
A. Fertilizer Enterprises	594.64	86.50 ^{a/}	729.61	7.854	3,029
B. Chemical & Allied Ent.	57.23	159.48	73.08	5.598	3,430
C. Pharmaceutical Ent.	19.82	34.86	46.19	1.728	692
D. Rubber Industries	33.69	29.55	55.96	1.780	2,268
E. Match Factories	<u>21.00</u>	<u>66.42</u>	<u>38.79</u>	<u>2.208</u>	<u>8,678</u>
Total	726.38	376.81	943.63	19.168	18,097

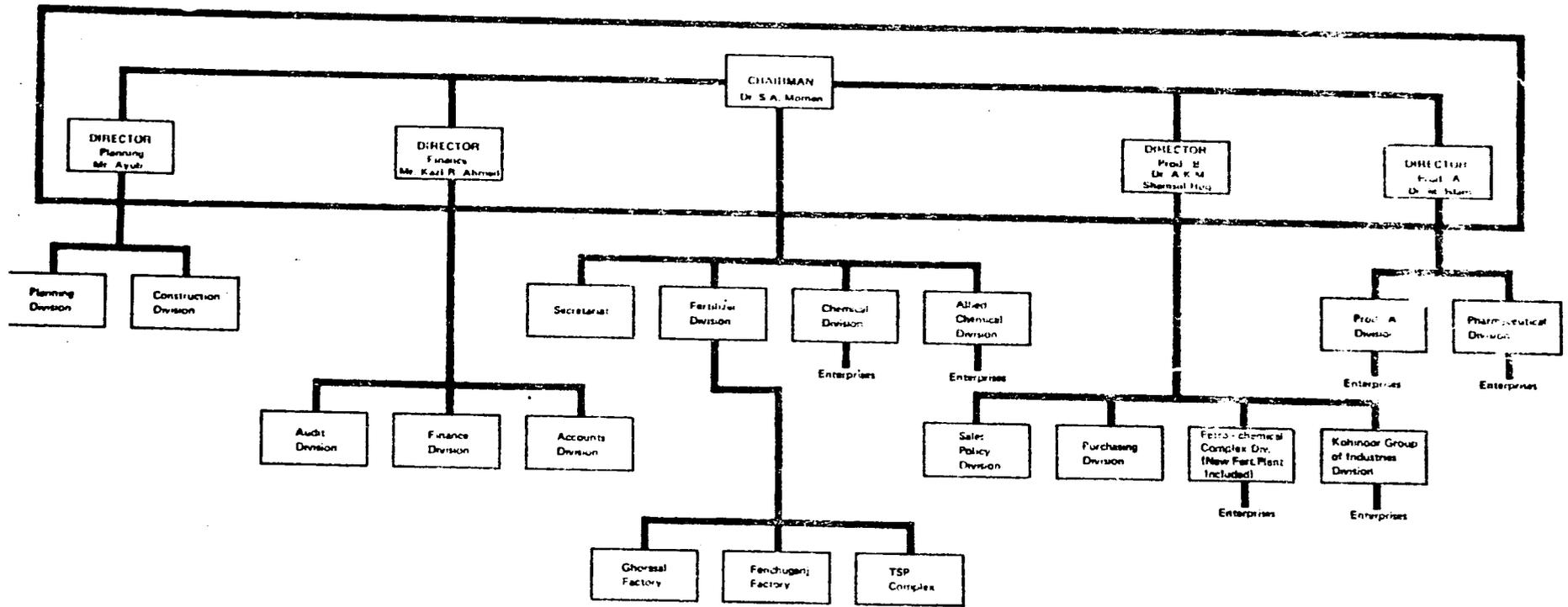
a/ TSP factories not yet in commercial operation due to non-availability of phosphate rock.

Table 2

Revenue & Expenditures of HFCPC
Year Ended June 30, 1973
(Tk '000)

<u>Revenues</u>		
Overhead Charges to Enterprises	6,005.0	
Other Income	<u>11.2</u>	
Total	6,016.2	
<u>Expenditures</u>		
Bare Salaries & Wages	1,969.5	50.0
Bonus	106.8	2.7
Leave Pay & Gratuity	295.5	7.5
Fringe Benefits	680.6	17.3
Provident Fund	116.2	3.0
Other Expenditures	765.1	19.5
of which Rent & Tax	(246.6)	(6.3)
Interest	<u>(2.9)</u>	<u>(0.1)</u>
Total	3,923.7	100.0
 Surplus	 <u>2,092.5</u>	
<u>Fringe Benefit & Salary Supplements Package as % of Base Salary</u>		
Bonus		5.5
Leave Pay & Gratuity		15.1
Fringe Benefits		<u>34.7</u>
Total Package as % of Base Salaries and Wages (i.e. Tk 1,959.5)		55.3

BFCPC CORPORATE ORGANIZATION CHART, APRIL 1974
 BFCPC BOARD OF DIRECTORS



BANGLADESH: ASHUGANJ FERTILIZER PROJECT

PLANT SIZE

1. A plant size of 1,600 TPD urea has been selected with intermediate ammonia facilities being sized for total conversion of ammonia to urea. Originally it had been anticipated that a capacity of 1,000 TPD ammonia and 1,500 TPD urea may be adopted leaving an excess of 125 TPD ammonia for use in other petrochemical projects planned at that time by the Government, and it was this capacity which was nominated in the prequalification notice issued to General Contracting firms in August 1973. In anticipation, however, that reasonably firm prospects for the implementation of auxiliary projects to consume the excess ammonia may not emerge by the time when a final investment decision had to be made, the financial implications of increasing the urea unit size to 1,700 TPD had been assessed which indicated an additional investment of the order of US\$4 million with little or no change in the rate of return.
2. Since these preliminary plans were first considered, however, Government schemes to establish auxiliary ammonia consuming projects have been reconsidered particularly in view of the preferred use of available ammonia for production of nitrogenous fertilizer. Therefore, there would be no justification at present for incorporating excess ammonia capacity in the proposed project. Since the market is not considered to be a constraint, sizing of a balanced plant has become a matter of economies of scale.
3. It has been adjudged that 1,600 TPD urea is the maximum size limit up to which appreciable benefits of scale can be achieved. To go beyond this size would almost certainly involve adoption of double train urea units thus nullifying most of the scale advantage or alternatively, unless bidding is unduly restricted, introducing an unacceptable element of risk in the scale up of commercially proven designs. Again 1,600 TPD urea requires an ammonia production of approximately 925 TPD, which is a commonly sized unit, and which has been adopted in a number of previous cases notably in the Bank financed project at Multan in Pakistan and in India where this size of unit has been adopted as standard for both the Nangal and Sindri projects in which the Bank Group is participating, and for the three coal based plants presently under construction at Talcher, Ramagandam and Korba.
4. There would also not be any real benefit in going beyond the proposed unit size in order to satisfy future market requirements because it is clear that if Bangladesh is to become self sufficient in food production and to achieve maximum output of cash crops, it will require at least one and possibly two more such plants within the next 10 years. The objective therefore at this stage should be to select a unit size which can be conveniently and economically duplicated in the future in much the same manner as already realized in India. It is clear therefore that a 1,600 TPD urea plant size based on total conversion of ammonia from the aspects of economy, reliability and cost of operation, future planning and all other aspects represents the optimum choice for Bangladesh.

BANGLADESH: ASHUGANJ FERTILIZER PROJECT

PRODUCTION PROCESS, SUPPLY OF NATURAL GAS AND PLANT FACILITIES

A. Production Process and Supply of Natural Gas

1. The rated output of the plant will be 1,600 TPD urea for 330 days per annum giving a nominal output of 528,000 TPY. Actual output if a 90% on stream efficiency is maintained will be 475,200 TPY. The intermediate ammonia production facilities will be sized on the basis that all ammonia produced will be converted to urea in which case rated output would be approximately 925 TPD or just marginally over 1,000 short tons per day.

2. Gas from the Titas gas fields will be used for both process and fuel and will be supplied to the plant at a pressure of around 600 psig as required for direct steam reforming without further pressure boosting. It will be the responsibility of the Titas Gas Transmission Company to supply and install the necessary gas pipeline up to the works from the existing high pressure transmission line which passes under the railway bridge across the Meghna River approximately 1-1/2 km north of the plant site. This line will run below ground along the route of the access road to the site and the Titas Gas Transmission Company will provide a suitable metering station adjacent to the works area and a block valve in the main transmission line to enable full supplies to be maintained to the fertilizer works independently of any downstream failure.

Composition of the gas will be as below:

Methane	96.8%
Ethane	1.7%
Propane	0.4%
Butane and Higher	0.5%
Nitrogen	0.3%
Carbon Dioxide	0.3%
Cal. Value (Gross)	1,036 BTU/cu.ft.

The gas is classified as sweet with respect to sulphur content and the experience of the Ghorosal works which is also supplied with the same gas indicates that sulphur content is below 2 ppm. Producers of the gas, the Bangladesh Shell Oil Company Limited, remove liquified hydrocarbons in the gas fields so that the pipeline gas contains less than 2 US gal./1,000 cu. ft. The Bangladesh Shell Oil Company Ltd., which is 25% owned by the Government, operates the field and has determined the total reserves at about 63 billion cubic meters (M³). Details of the gas reserves for the major gas fields in Bangladesh including Titas and gas analysis are given in Annex 9. The gas offtake projections for the Titas gas field are shown in Annex 10. Even assuming the gas demand would continue to increase at about 11% per year predicted for the remainder of the decade, the Titas gas reserves would last for another 30 years.

3. Synthesis gas for ammonia production is produced from the feed gas in a series of steps beginning with a primary reforming with steam. Here, desulphurized gas is combined with superheated steam in an amount approximately equal to a 3 to 1 steam carbon ratio. The combined stream at a pressure of approximately 500-550 psig is then preheated to about 950 degrees F. and passed through catalyst filled 25/20 chrome nickel alloy tubes suspended in the radiant section of the reformer. In passing through the tubes the hydrocarbon components, mostly methane, are partly converted to carbon oxides and hydrogen and exit at a temperature normally in excess of 1,500 degrees F. The partially reformed gas then flows to a secondary reformer where it is mixed with preheated air in a quantity necessary to reform the unconverted hydrocarbons and at the same time provide the required amount of nitrogen for ammonia synthesis. Air required for the secondary reforming step is supplied from a centrifugal steam turbine driven compressor
4. Reformed gas from the secondary reformer now containing less than about 0.4% methane is cooled in waste heat boilers down to about 700 degrees F prior to introduction to the high temperature shift converter where part of the carbon monoxide content of the gas is converted to carbon dioxide by reaction with steam with an equivalent production of hydrogen. To complete this conversion of carbon monoxide the gas after cooling in additional waste heat boilers and after a protective fine sulphur removal is introduced into a second stage low temperature converter where the carbon monoxide content of the gas is reduced to about 0.5%.
5. The raw synthesis gas now contains essentially hydrogen, nitrogen, carbon dioxide and small amounts of hydrocarbons and carbon monoxide and now goes through a series of purification steps to provide an ammonia synthesis gas with a hydrogen/nitrogen rate of 3 to 1. In the first of these carbon dioxide is removed by any of a number of proprietary liquid scrubbing processes and then remaining carbon oxides are removed by conversion to methane by reaction with hydrogen over a suitable catalyst. The final synthesis gas then contains in addition to nitrogen and hydrogen, less than about 10 ppm oxides, the maximum which can be tolerated by the ammonia synthesis catalyst, and small amounts of methane which are continually purged from the following ammonia synthesis loop.
6. The carbon dioxide removed from the crude synthesis gas is regenerated from the rich liquid absorbent and is subsequently reacted with ammonia to form urea. The analysis of the natural gas from the Titas Gas fields, however, is such that the quantity of carbon dioxide produced in the gas reforming process described will not be sufficient for urea production and must be supplemented. The additional quantity required may be obtained either by absorption from reformer or auxiliary boiler flue gas followed by regeneration from the absorbent, or by complete combustion of a side stream of natural gas followed by absorption from the combustion products, or in exceptional cases by the excess production of crude synthesis gas with recycling of the excess quantity after carbon dioxide removal, back to the primary reformer where it is burned as fuel.

7. In the synthesis of ammonia the nitrogen hydrogen mixture is compressed to a pressure of 2,500-3,000 psi by a steam turbine driven 2 or 3 case centrifugal compressor with recycle gas containing about 11% ammonia being admitted to an interstage wheel. The compressed discharge gas after water cooling is then refrigerated and condensed ammonia removed in a liquid separator before the gases now containing only about 2% ammonia are reheated by heat exchange and passed to the ammonia converter. This vessel is of a special design containing a catalyst to promote the synthesis reaction and special provision for removal of the reaction heat developed, so as to maintain optimum reaction temperatures. The effluent gas from the converter contains about 11% and is cooled from the reaction temperature of about 900 degrees F. first in preheating boiler feed water and then by heat exchange with incoming converter feed gas, before recycling to the synthesis gas compressor as described.
8. Liquid ammonia produced in the process will be stored in a refrigerated liquid ammonia storage tank having a capacity of about 5-6 days production or some 5,000 tons.
9. In the production of urea, ammonia and carbon dioxide are combined at a pressure of 2,000-3,500 psi and a temperature of approximately 360 degrees F. when ammonium carbamate is formed as an intermediate product, which is subsequently dehydrated with formation of urea. Neither of these reactions, however, proceeds to completion with the result that the reaction product consists of a urea/ammonium carbamate solution containing large quantities of dissolved ammonia and carbon dioxide. The next step in the production of urea therefore is to separate the non-converted carbamate and reaction gases and recycle them to the reactor, and the means of doing this represents the major distinction between the various processes commercially available. In one commonly used process the pressure of the reaction products is reduced in steps with consequent decomposition of carbamate back into carbon dioxide and ammonia which are then redissolved by countercurrent absorption and recycled back to the reactor. In another process the decomposition is achieved without reduction in pressure by stripping the solution leaving the reactor with carbon dioxide and in another process a similar stripping process is used employing gaseous ammonia. In all these processes the final urea solution is concentrated by evaporation and then in most cases prilled directly if a biuret concentration of up to 1-1/4 percent can be tolerated, or after vacuum crystallization if a low biuret^{1/} grade is required. For the project which will produce urea with up to 0.9% biuret, a preselection of urea process is not being made and instead a selection will be made based on the merits of the proposals received from contractors both at the prequalification and bidding stage.

^{1/} Less than 0.5%.

B. Plant Facilities

10. Of the approximate total area of 500 acres already acquired at Ashuganj by the EFCPC, some 130 acres initially will be filled to a level of 32 feet to accommodate the proposed plant, the staff housing complex, and necessary access roads and rail sidings. It is estimated that the level of this area will have to be raised by an average of 20 feet requiring the dredging of approximately 4-1/2 million cubic yards of sand from the bed of the Meghna River. Preliminary estimates indicate that the plant site will occupy approximately 65 acres, the housing complex 45 acres, with the balance being taken up by rail sidings, access roads and vacant areas. It is planned that construction of an embankment around the perimeter of the area to be developed and main access road connecting the site to the Ashuganj railway bridge area would be completed in the dry season of 1974/75 permitting the dredging work to continue through the wet season of 1975 with completion being scheduled around October.

11. After reclamation is completed and after allowing a reasonable period for settlement, civil works on the plant site and construction of the first stage of the staff housing complex would begin. The staff housing complex will accommodate all key staff to be employed by the works when completed, such as management and supervisory personnel, shift operators and key production and maintenance workers and security and safety personnel. Currently the total number of personnel estimated to fall into this category is around 400, and it is planned to lay out the housing complex accordingly. A later review of requirements, however, will be carried out at the time of detailed planning of the complex. Initially the houses will be utilized for accommodating key personnel engaged in the plant construction phase.

12. A wharf will be constructed at the plant site designed to be capable of handling the loading of the entire output from the works onto coasters or suitable barges for local and export delivery as desired. At this stage the merits of shipment of part of the product in bulk rather than in bags is being studied and until a final decision is reached the design of the wharf facilities will not be defined. However, it is intended that modern materials conveying and loading equipment will be provided. It is anticipated that a large portion of the plant output will be handled by rail and for this a railway spur and sidings will be provided connecting the plant site with the existing nearby Bangladesh Railway system. Necessary freight cars will be provided by Bangladesh Railways but two locomotives will be included as part of the project for the movement of freight cars within the plant area and adjacent sidings.

13. Water requirements of the plant and housing complex will be taken from the Meghna River which has a very low salinity at the plant location. Raw river water will first be clarified in a circular basin with continuous mechanical sludge removal and then filtered in automatic self-cleaning sand filters before being supplied to the potable water chlorination and supply system, to the demineralizers for boiler feed water, to the plant cooling

water system make up and to other general uses. At this stage it is anticipated that a recirculation cooling water system will be adopted but the merits of an alternative once-through scheme will be evaluated in the course of more detailed planning of the works.

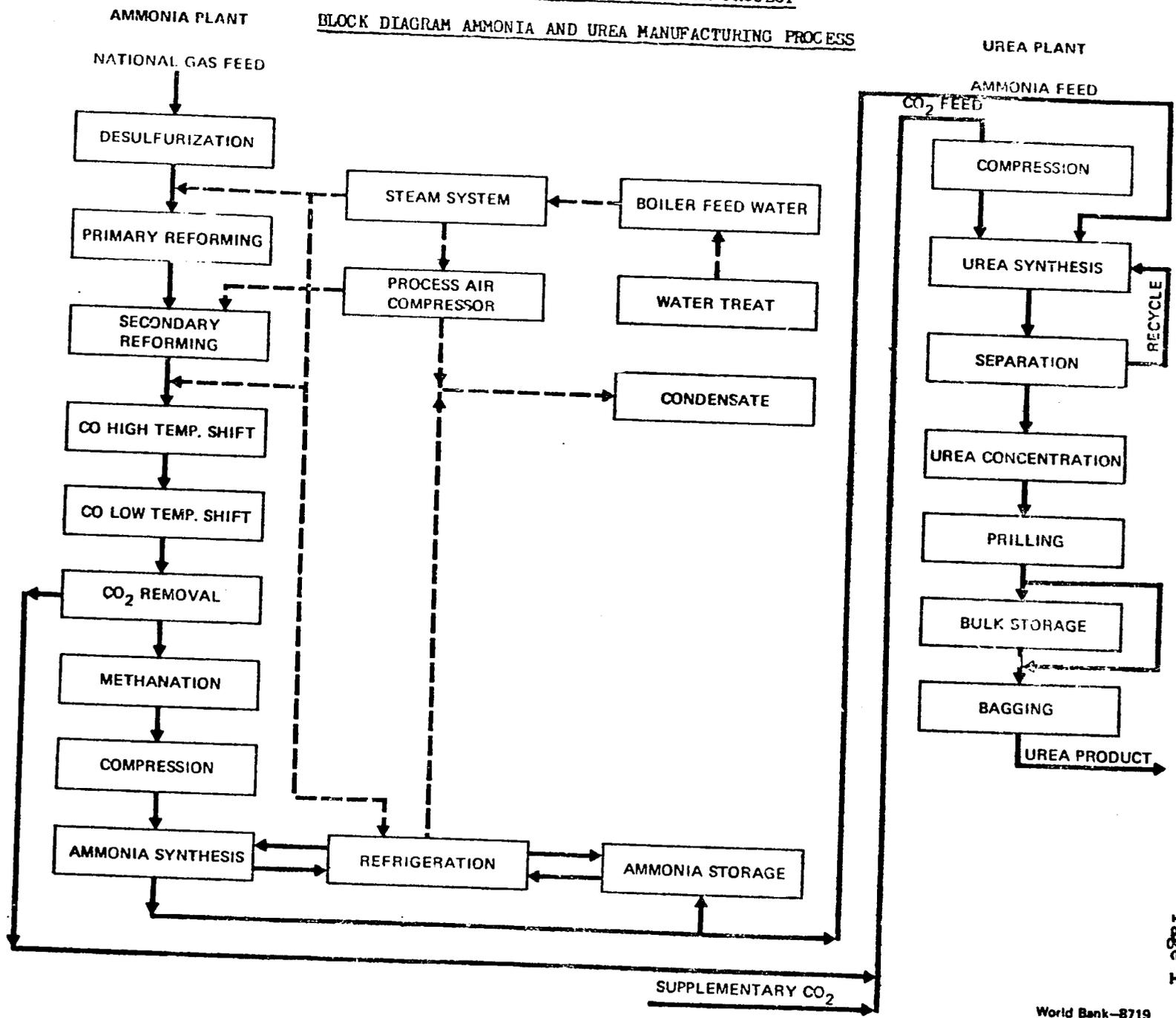
14. Preliminary estimates indicate that the entire works will consume approximately 10 MW of electric power. The nearby Ashuganj power station has adequate spare generating capacity to supply this requirement if desired but at present pending further examination of the reliability of this source, provision has been made for captive power generation facilities to be included as part of the project, with the existing power station providing standby only. Final decision on the power source will be based on maximum reliability and the economic and technical merits of proposals to be received from the designers.

15. All necessary buildings and stores required for the efficient and continuous operation of the works will be included in the project. Among these are a 2,000 sq. meter fully equipped maintenance shop, gate house, fire station, laboratory, canteen, first aid station and adequate warehouses for the storage of spare parts and other stores. For the storage of bulk urea a 45-day or 72,000-ton capacity bulk store will be provided fitted out to maintain dehumidified air conditioning necessary for the prevention of caking. Additionally, a bagged urea store of 15-day or 24,000-ton capacity will be included.

16. The type of bag to be used for the urea product is still the subject of investigation and may be a 25-kg capacity polyethylene lined jute bag or a single film heavy duty polyethylene bag. The plant will be equipped with facilities for the manufacture either of the polyethylene liners or of the polyethylene bags as the case may be. A final decision will be taken during the course of the design of the plant and will be largely influenced by bag production costs and recommendation of the Marketing Consultants as to the preferred type of bag under prevailing conditions of fertilizer distribution and usage.

17. Special attention will be paid during design and specifications of the facilities to minimize the emission and/or discharge of noxious waste materials. Wherever possible these materials will be recycled within the process units. Additionally, the design of the process units will be in accordance with European and U.S. standards with respect to the composition of liquid and gaseous effluents. Under these conditions and especially with the added advantage of having a clean sulphur free raw material it is expected that the works will have little or no undesirable effect on the environment.

BANGLADESH: ASHUGANJ FERTILIZER PROJECT
BLOCK DIAGRAM AMMONIA AND UREA MANUFACTURING PROCESS



BANGLADESH: ASHUGANJ FERTILIZER PROJECT
RESERVES AND ANALYSIS OF NATURAL GAS IN BANGLADESH

<u>FIELDS</u>	<u>BSOC^{a/}</u>					<u>BPL^{b/}</u>		<u>TOTAL</u>
	<u>Rasidpur</u>	<u>Kailas Tila</u>	<u>Titas</u>	<u>Habiganj</u>	<u>Bakhrabad</u>	<u>Sylhet</u>	<u>Chhatak</u>	
<u>RESERVES (10⁹ cu.ft.)</u> (as at 25 March 1974)								
Proven	490	380	950	1000	740	-	-	-
Discounted Probable (50%)	380	150	900	190	740	-	-	-
Discounted Possible (25%)	<u>190</u>	<u>70</u>	<u>400</u>	<u>90</u>	<u>1300</u>	-	-	-
Total	1060	600	2250	1280	2780	340	40	8350
Cumulative Production	0	0	40	20	0	70	10	140
Reserves as at 1-1-74	1060	600	2210	1260	2780	270	30	8210
<u>GAS ANALYSIS, % vol.</u>								
Methane	98.2	95.7	96.8	97.8	94.3	95.4	99.05	
Ethane	1.2	2.6	1.7	1.5	3.4	2.67	0.24	
Propane	0.2	0.9	0.4	0	0.8	0.3	0	
Butane & higher	0.1	0.4	0.5	0	0.6	0.78	0	
Nitrogen	0.25	0.2	0.3	0.7	0.4	0.37	0.67	
Carbon dioxide	0.05	0.2	0.3	0	0.5	0.48	0.04	
Mercaptan Sulphur Grains/100 cu. ft.	0	0	0	0	0	0.29	0	
<u>CALORIFIC VALUE</u> (Gross), BTU/cu.ft.	1014	1050	1036	1020	1022	1052	1007	
<u>CONDENSATE RECOVERY</u>								
BBL/10 ⁶ cu. ft.	0.3	10.0	1.5	0.03	2.0	3.4	Trace	

^{a/} Bangladesh Sheel Oil Co.
 Industrial Projects Department
 June 1974

^{b/} Bangladesh Petroleum, Ltd.

BANGLADESH: ASHUGANJ FERTILIZER PROJECT
GAS OFF-TAKE PROJECTION 1973/74 - 1978/79
TITAS GAS TRANSMISSION & DISTRIBUTION CO. LTD.

(in million cu.ft.)

<u>YEAR</u>	<u>POWER</u>		<u>FERTILIZER</u>		<u>IND. COMM. AND DOMESTIC</u>		<u>TOTAL</u>	
	<u>Daily</u>	<u>Yearly</u>	<u>Daily</u>	<u>Yearly</u>	<u>Daily</u>	<u>Yearly</u>	<u>Daily</u>	<u>Yearly</u>
1973-74	21	6,720	35	11,200	6	1,920	62	19,840
1974-75	25.7	8,224	36	11,520	7	2,240	68.7	21,984
1975-76	29	9,280		11,520	8.5	2,720	13.5	23,520
1976-77	32.3	10,336	37	11,840	8.7	2,784	78.0	24,960
1977-78	37.5	12,000	37	11,840	11	3,520	85.5	27,360
1978-79	43	13,760	52	16,640	13	4,160	108	34,560
TOTAL		<u>60,320</u>		<u>74,560</u>		<u>17,344</u>		<u>152,224</u>

BANGLADESH: ASHUGANJ FERTILIZER PROJECTTENTATIVE OPERATIONAL MANAGEMENT ASSISTANCE TEAM DURING INITIAL OPERATING YEARS(Not including personnel also to be provided for
administration and financial control)

<u>1st Year</u>	<u>Production and Maintenance Manager</u>	(1)
	Ammonia Plant Supervisor	(1)
	Urea Plant Supervisor	(1)
	Utilities Supervisor	(1)
	Process Instructor (Relief Supervisor)	(1)
	Production Control Chemist	(1)
	Maintenance Scheduler	(1)
	Spare Parts Controller	(1)
	Plant Maintenance Supervisor	(1)
	Machine Maintenance Specialist	(2)
	Instrumentation Maintenance Specialist	(1)
	Total	<u>12</u>
 <u>2nd Year</u>	 <u>Production and Maintenance Manager</u>	 (1)
	Ammonia Plant Supervisor	(1)
	Urea Plant Supervisor	(1)
	Utilities Supervisor	(1)
	Maintenance Scheduler	(1)
	Plant Maintenance Supervisor	(1)
	Machine Maintenance Specialist	(1)
	Instrumentation Maintenance Specialist	(1)
	Total	<u>8</u>
 <u>3rd Year</u>	 Process Advisors	 (2)
	Maintenance Advisors	(2)
	Total	<u>4</u>

Industrial Projects Department
July 1974

PROJECT SCHEDULE

1. Site Development Contract

All international advertisements run by May 15.
Responses received by June 21.
Bidders list compiled June 30.
Bank approval Bidder's List and Bidding Documents July 7.
Bids received September 7.
Proposal for award received by Bank September 30.
Bank approval of award October 14.
Contract signed October 30.
Dredging company starts work January 1, 1975.

2. General Contract

Prequalification of bidders by end June 1974.
Final draft tender documents finished by end November.
Lender approval bidder's list and tender documents end October 1974 (allowing mailing time, etc.).
Tender documents issued December 1974.
Bids received by end March 1975.
Bid evaluation completed by May 1975.
Lender approval proposed award June 1975.
Contract signed June 1975.
Contract starts work and contract effective by July 1975.

3. Design and Procurement

Start July 1, 1975.
Basic engineering finished by October 1975.
International advertisements all published by August 1975.
Preparation of contractor's procurement procedures by end August 1975.
Lender approval of procurement procedures by end September 1975.
Prequalification of bidders completed by end October 1975.
Lender approval prequalified bidders list November 1975.
Detailed engineering - 12 months, finished by October 1976.
Ordering major equipment items (other than critical) start October 1975, finish end January 1977.
Ordering bulk items - start January 1976, finish end May 1977.
Delivery major items - start September 1976, finish end November 1977.
Delivery bulk items - start end July 1976, finish end January 1978.

4. Construction and Erection

Piling start January 1, 1976, finish end June 1976.
Housing complex start March 1, 1976, finish end February 1977.
Civil works start end April 1976, finish end June 1977.
Rail spur start March 1, 1976, finish end May 1976.
Plant erection start end June 1976, finish end December 1977.
Gas pipeline start end February 1977, finish end June 1977.

5. Commissioning and Start-Up

Maintenance and operator training to commence January 1, 1977,
finish end August 1977.

Plant testing start April 1977, finish end June 1978.

Performance test start end June 1978, finish end July 1978.

Handover by end August 1978.

BANGLADESH - AMMONIUM NITRATED PROJECT

WORKING CAPITAL CALCULATION AT MID-1978 PRICES^{a/}

	Foreign Exchange (c.i.f.)	Local Currency	Total
1. Raw Material Inventory			
a. One spare set of catalysts ^{b/}	0.6	0.3 ^{c/}	0.9
b. Chemicals (1 year's supply)	0.1	0.2 ^{c/}	0.6
c. P.E. Chips Inventory (121 operating days)	1.5	1.0	2.5
2. Spare Parts Inventory (2 years' supply at Acquisition Cost ^{b/})	4.3	1.9 ^{c/}	6.2
3. Work-in-Process			
5 operating days Ammonia output (4,600 tons) @ 92.7 /ton ammonia ^{d/}	-	0.4	0.4
4. Finished Goods' Inventory			
27 operating days' production of urea and bags (43,200 tons) @ \$80.7/ton	-	3.5	3.5
5. Accounts Receivable			
29 operating days' production (46,500 tons) @ \$155/ton	-	7.2	7.2
6. Minimum Operating Cash Balance			
1/4 of annual fixed cost excluding depreci- ation charges	-	1.0	1.0
7. Gross Working Capital	6.8	15.5	22.3
8. Accounts Payable			
27 operating days' natural gas consumption	-	0.6	0.6
9. Working Capital Portion Included in Capital Cost Estimate			
a. One spare charge of catalyst	0.6	0.3	0.9
b. 2 years' spare parts	4.3	1.9	6.2
Sub-Total	4.9	2.2	7.1
10. Non-Cash Expenses included in Inventories ^{e/}	-	1.8	1.8
11. Additional Initial Working Capital (7-8-9-10) to be Included in Project Cost	1.9	10.9	12.6

a/ Based on 90% capacity utilization (e.g. 27 operating days = 30 calendar days).

b/ Included in capital cost estimate or total project cost.

c/ 40% duties and 3% for local handling.

d/ The ratio of the ammonia unit capital costs to the capital costs of both the ammonia and the urea units is 72%. Hence 72% of the annual fixed cost is allocated to the ammonia production (or \$24.6/ton of ammonia). The variable cost per ton of ammonia is \$28.1 (variable cost/ton of urea, less bagging cost x 1,600 = \$20).

e/ These items are depreciation at \$37.7/ton of urea and \$17.2/ton of ammonia.

BANGLADESH - ASHUGANI FERTILIZER PROJECT
RECURRENT OPERATING COST ESTIMATES

	Unit	Consumption Per Ton of Urea	FOR FINANCIAL ANALYSIS			FOR ECONOMIC ANALYSIS		
			Mid-1978 Cost USS/Unit	Annual Cost \$ Million	at 90% Capacity ^{a/} \$ Cost/Ton Urea	Mid-1978 Cost US\$/Unit ^{m/}	Annual Cost \$ Million	at 90% Capacity ^{n/} \$ Cost/Ton Urea
I. VARIABLE COST								
1. Natural Gas	1,000 SCF	27.8 ^{b/}	0.50 ^{e/}	6.6	13.90	0.50	6.6	13.90
2. Catalysts & Chemicals	Cost/ton urea	1.0	2.22 ^{d/}	1.1	2.23	1.61	0.8	1.61
3. P.E. Chips for Heavy Bags	kg	9.86	1.31 ^{g/}	6.1	12.92	0.83	3.9	8.23
Total Variable Cost				13.8	29.05	0.83	11.3	23.74
II. SEMI-VARIABLE COST								
4. Production Bonus	% of Annual Salary	Variable ^{f/}	0.8 x 10 ⁶	0.1	0.28 ^{g/}	0.8 x 10 ⁶	0.1	0.28 ^{g/}
III. FIXED COSTS								
5. Salaries and Wages ^{h/}	Person	Units/Year						
6. Fringe Benefits and Overhead ^{i/}	% of Annual Salary	1,182 62%	688 0.8 x 10 ⁶	0.8 0.5	1.68 1.05	688 0.8 x 10 ⁶	0.8 0.5	1.68 1.05
7. Maintenance Materials ^{j/}	Annual Cost	1.0	3.6 x 10 ⁶	3.6	7.58	2.6 x 10 ⁶	2.6	5.47
8. Depreciation ^{k/}	Annual Cost	1.0	17.9 x 10 ⁶	17.9	37.67	0.0	0.0	0.0
9. Insurance ^{k/}	Annual Cost	1.0	0.8 x 10 ⁶	0.8	1.66	0.8 x 10 ⁶	0.8	1.68
10. BFCPC Overhead Charges ^{l/}	Annual Cost	1.0	0.8 x 10 ⁶	0.8	1.68	0.8 x 10 ⁶	0.8	1.68
Total Fixed Cost				24.4	51.34	0.8	5.5	11.56
IV. TOTAL RECURRENT OPERATING COST				38.3	60.67	16.9	35.58	

NOTES TO RECURRENT OPERATING COST ESTIMATES
Table

- a For other than 90% capacity utilization, say X%, multiply the fixed cost/ton of urea (at 90% capacity) by the factor $\left(\frac{90}{X}\right)$ to get the fixed cost/ton of urea at X% capacity utilization.
- b/ If the factory will not have a captive power plant (e.g. buys power from the nearby power station), then gas consumption will only be 26,300 SCF/ton of urea or \$13.15 per ton of urea. However, the purchased power will have the following operating cost contributions:

Power Cost

- 1) Variable cost contribution (energy charge) = \$1.64/ton of urea
- 2) Fixed cost contribution (maximum demand charge) = \$152,640 per year or 0.32 per ton of urea at 90% output.

These costs are based on the following:

- 1) Mid-1974 energy charge for chemical industries is Tk 9.40 (\$1.25/100 KWH. This is escalated by 59% (based on domestic inflation rates in Annex 6-8) to arrive at mid-1978 price.
- 2) Energy consumption is 82.6 KWH per ton of urea.
- 3) The maximum power demand is 6,000 KW per month.
- 4) The mid-1974 maximum power demand charge is Tk 10.00/KW pwer month. This is escalated by 59% and comes to an annual rate of 2.12 per KW of maximum demand per month.

The contingency in the capital cost estimate contains \$2.4 million f.o.b. (escalated) for a power plant, or a delivered cost of about \$3.4 million. The contribution of the captive power generator to the annual depreciation charges is about \$0.3 million for 12 years. The contribution to the annual maintenance material and insurance expenses is estimated at \$0.1 million (total contribution to fixed cost is \$0.4 million per year).

Without a captive power generator therefore, the operating cost would be:

- 1) Variable cost/ton of urea = \$29.94
- 2) Semi-variable cost = \$0.28/ton of urea at 90% output
- 3) Annual fixed cost = \$24.2 million or \$50.90/ton of urea at 90% output
- h) Total recurrent operating cost = \$81.12/ton of urea at 90% output.

- c/ Based on Tk 3.72/MSCF for 1978 as set by the Government. The March 1971 price was Tk 1.60/MSCF. In early April, a proposal from the Titas Gas Transmission Company to raise the price to Tk 2.32/MSCF by the latter part of 1971 was approved by the Government.
- d/ Based on mid-1974 cif cost of US\$1.10 per ton of urea. This corresponds to approximately US\$300,000 per year for chemicals and US\$500,000 per one set of catalysts (mid-1974 cif cost), implying an average life of 2.25 years for the catalysts. Price escalation factor (based on international inflation rates in Annex 15) to mid-1978 prices is 42%. Duties are 40% and local handling 3% of cif cost. The 2 sets (initial charge and spares) of catalysts included in the capital cost estimate is valued at about US\$1.2 million cif, based on acquisition cost (US\$1.8 million delivered). The mid-1978 cost of catalysts and chemicals comes to US\$2.23 per ton of urea, with chemicals accounting for US\$1.27 and catalysts about US\$0.96.
- f/ The total annual salary is \$0.813 million based on the proposed staffing schedule with 1,182 jobs. The salary and wage levels are based on the recommendations of two national commissions (the average of the minimum and the maximum salary/wage for each category was used). The average annual salary comes to \$687.82 per job. The production bonus is assumed to be 1 month's salary at 80% output, 2 month's salary at 90% and 3 month's salary at 100% output. A minimum bonus of one month's salary is provided for the first and second operating years.
- g/ Values for other capacity levels:
- | | Prod. bonus/ton urea | |
|---------------------------------|----------------------|----------|
| | Financial | Economic |
| 1) first year (70% capacity) | \$0.183 | \$0.183 |
| 2) at 80% capacity utilization | \$0.160 | \$0.160 |
| 3) at 100% capacity utilization | \$0.385 | \$0.385 |
- h/ Fringe benefits and factory overhead are taken as 50% and 12% respectively of annual salaries and wages as experienced in the Ghorasal factory.
- i/ Based on 3% of delivered equipment cost for plant and offsites at mid-1978 prices calculated as follows:

US\$ Million

1) Plant and offsite equipment (FOB) cost at Oct. 1974 prices (items 3, 4, 5 and 7)	50.8
2) Physical contingency at Oct. 1974 prices (items 3, 4, 5 and 7)	<u>5.8</u>
3) Subtotal	56.6
4) Ocean freight and insurance, 10% of (3)	<u>5.7</u>
5) Subtotal	62.3
6) Duties, 40% of (5)	<u>24.9</u>
7) Subtotal	87.2
8) Price escalation to mid-1978 prices, 36% of (8)	<u>31.4</u>
9) Subtotal	118.6
10) Local handling at Oct. 1974 prices, 3% of (3)	1.7
11) Price escalation to mid-1978 prices, 49% of (10)	<u>0.8</u>
Delivered Cost at Mid-1978 Prices	<u>121.1</u>

Annual maintenance materials costs = $0.03 \times 121.1 = \text{US\$}3.6$ million
(of which duties = US\$1.0 million).

The spare parts included in the capital cost estimate is equivalent to 2 years supply of maintenance materials and derived as follows:

1) Two year's maintenance materials (cif) at Oct. 1. 1974 prices $2 \times 0.03 \times 62.3$	= 3.7
2) Duties (40%) and local handling 3%	= <u>1.6</u>
3) Subtotal	5.3
4) Escalation to expenditure commitment date, 17%	= <u>0.9</u>
5) Total Acquisition Cost of Spare Parts	6.2

j/ Refer to Annex 6-1 for depreciation schedule.

k/ Insurance cost is taken as 0.33% of the capital cost (\$249.4) excluding land acquisition (\$0.4), site preparation (\$13.8), and management assistance (\$7.9) or US\$227.3 million.

l/ The BFCPC overhead charges are based on the current allocation procedure. Each enterprise is charged a proportion of the BFCPC total charges equal to the ratio of the installed cost of the fixed assets of the enterprise to the installed cost of the fixed assets of all the BFCPC enterprises.

The installed or original cost of the fixed assets of all the existing (1974) BFCPC enterprises is presently Tk 762 million (US\$101.6 million). The proposed fertilizer plant will have fixed assets installed at \$216.9 million. (Capital cost \$249.4 million less management assistance including contingency of \$7.9 million and the net working capital of \$20.8 million including \$8.0 million for spares and 2 sets of catalysts included in equipment cost estimates.) The local currency equivalent is thus Tk 1,654 million. Consequently, the proposed fertilizer plant will bear about 68% of the total BFCPC overhead charges. The present (1972/73) BFCPC overhead charges total Tk 6.0 million (although expenditures come to only Tk 4.0 million). This Tk 6.0 million is escalated by 50% to Tk 9.0 million, and used as the base for the BFCPC overhead charges against the proposed plant.

m/ Import duties or excise duties have been excluded. Imported materials, such as catalysts, chemicals, P.E. chips and maintenance materials are valued at their cif cost plus local handling at domestic market prices. The shadow price of local labor, services, and goods are taken as equal to the market prices (less excise taxes where appropriate). These are converted to US dollars using the official exchange rate of Tk 7.50 per US dollar. The economic price of natural gas is assumed to be identical to the financial price of Tk 3.72 (US\$0.50) per MSCF.

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BANGLADESH - ASHUGANJ FERTILIZER PROJECTCALCULATION OF CAPITAL COSTS AT CONSTANT MID-1978
US DOLLARS FOR INTERNAL RATE OF RETURN COMPUTATION
(US\$ Million)

	<u>1974^{a/}</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978^{b/}</u>	<u>Total</u>
General Annual Inflation Rate, %						
1. International	14	11.0	7.5	7.5	7.5	
2. Domestic	18	15	10	10	10	
Compound Factor from Mid-Year to Mid-1978						
1. International	1.36	1.27	1.16	1.08	1.02	
2. Domestic	1.49	1.36	1.21	1.10	1.03	
Disbursement at Current US Dollars ^{c/}						
1. Foreign Exchange	Nil	21.4	49.8	56.9	14.2	142.3
2. Local Currency:						
(a) Duties	Nil	5.7	13.2	15.1	2.7	36.7
(b) Others	Nil	5.0	11.6	13.3	13.3	43.2
Total	Nil	32.1	74.6	85.3	30.2	222.2
Capital Costs at Mid-1978 US Dollars						
1. For Financial Rate of Return	Nil	41.7	87.8	92.7	31.0	253.2
2. For Economic Rate of Return ^{d/}	Nil	34.0	71.8	76.1	28.2	210.1

a/ 3 months only. Capital cost estimate is based on prices as of the beginning of October 1974.

b/ 9 months only.

c/ From Annex 5-5 excluding interest during construction.

d/ Excludes duties and interest during construction.

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BANGLADESH - ASHUGANJ FERTILIZER PROJECT
BALANCE SHEET AT START AND END OF FIRST OPERATING YEAR
(S million)

	Operating Year 1 (8 months)	
	Starting Amount (Aug. 1, 1978)	Ending Amount (Dec. 31, 1978)
I. ASSETS		
A. Current Assets		
1. Cash	9.9	3.5
2. Accounts Receivable	0.0	7.2
3. Finished Goods and In-Process Inventory	0.4 ^{a/}	3.9
4. Raw Materials and Spare Parts ^{b/}	10.2	10.2
Total Current Assets	20.5	24.8
B. Gross Fixed Assets ^{c/}		
Less: Accumulated Depreciation	229.5	229.5
Net Fixed Assets	0.0	7.5
Total Assets	229.5	229.0
	250.0	244.3
II. LIABILITIES		
A. Current Liabilities		
1. Accounts Payable	0.6	0.6
2. Loan Portion due within Year	0.0	0.0
Total Current Liabilities	0.6	0.6
B. Long-Term Debt		
	142.3	142.3
C. Equity		
	107.1	107.1
D. Retained Earnings		
	0.0	(3.?)
Total Liabilities	250.0	246.8

^{a/} Work-In Process Inventory only

^{b/} As follows: (S million)

i. Spare Catalysts	0.9
ii. Chemicals	0.6
iii. Spare Parts	6.2
iv. P.E. Chips Inventory	2.5
	10.2

^{c/} Depreciable assets of \$214.3 million plus \$11.3 million for land and site development and \$0.9 million for one charge of catalyst (Annex 6-1).

INCOME STATEMENT FOR THE YEAR ENDING DECEMBER 31

(in \$ million)

	1 1978	2 1979	3 1980	4 1981	5 1982	6 1983	7 1984	8 1985	9 1986	10 1987	11 1988	12 1989	13 1990
INCOME STATEMENT													
UTILIZATION(%)	50	75	90	90	90	90	90	90	90	90	90	90	90
UREA OUTPUT(TONS)													
PRODUCTION	110000	396000	475200	475200	475200	475200	475200	475200	475200	475200	475200	475200	237600
INVENTORY ADJ.	43200	0	0	0	0	0	0	0	0	0	0	0	0
UNITS SOLD	<u>66800</u>	<u>396000</u>	<u>475200</u>	<u>237600</u>									
UNIT PRICE(\$)	155	155	155	155	155	155	155	155	155	155	155	155	155
SALES(\$MILLION)	<u>10.35</u>	<u>61.38</u>	<u>73.66</u>	<u>36.83</u>									
PRODUCTION COSTS													
VARIABLE COSTS													
NATURAL GAS	1.53	5.50	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	3.30
BAGGING MATLS.	1.42	5.12	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	3.07
CATALYSTS & CHEM	0.25	0.88	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.53
TOTAL VARIABLE	<u>3.20</u>	<u>11.50</u>	<u>13.80</u>	<u>6.90</u>									
SEMI-VARIABLE COST													
PRODUCTION BONUS	0.07	0.07	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.07
FIXED COSTS													
WAGES & OVERHEAD	0.54	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	0.65
MAINTENANCE MATLS.	1.50	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	1.80
INSURANCE EXP.	0.33	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.40
BFCPC OVERHEAD	0.33	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.40
DEPRECIATION	7.46	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	8.95
TOTAL FIXED COSTS	<u>10.17</u>	<u>24.40</u>	<u>12.20</u>										
TOTAL PROD. COSTS	13.43	35.97	38.34	38.34	38.34	38.34	38.34	38.34	38.34	38.34	38.34	38.34	19.17
INVENTORY ADJ.	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF SALES	<u>9.95</u>	<u>35.97</u>	<u>38.34</u>	<u>19.17</u>									
OPERATING PROFIT	0.41	25.41	35.31	35.31	35.31	35.31	35.31	35.31	35.31	35.31	35.31	35.31	17.66
OTHER CHARGES													
INTEREST ON LT DEB	3.56	14.23	13.16	11.73	10.31	8.89	7.47	6.04	4.62	3.20	1.78	0.36	0.00
PROFIT BEFORE TAX	-3.15	11.18	22.16	23.58	25.00	26.42	27.85	29.27	30.69	32.11	33.53	34.96	17.66
INCOME TAX(55%)	0.00	4.41	12.19	12.97	13.75	14.53	15.32	16.10	16.88	17.66	18.44	19.23	9.71
NET PROFIT	<u>-3.15</u>	<u>6.76</u>	<u>9.97</u>	<u>10.61</u>	<u>11.25</u>	<u>11.89</u>	<u>12.53</u>	<u>13.17</u>	<u>13.81</u>	<u>14.45</u>	<u>15.09</u>	<u>15.73</u>	<u>7.95</u>
CUM RET PROF BEG.	0.00	-3.15	3.61	13.58	24.19	35.44	47.33	59.86	73.04	86.85	101.30	116.39	132.12
CUM RET PROF END	-3.15	3.61	13.58	24.19	35.44	47.33	59.86	73.04	86.85	101.30	116.39	132.12	140.06
NET PROFIT % SALES	-30.43	11.02	13.54	14.41	15.27	16.14	17.01	17.88	18.75	19.62	20.49	21.36	21.57

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FUNDS FLOW FOR THE YEAR ENDING DECEMBER 31

(in \$ Million)

	1 1978	2 1979	3 1980	4 1981	5 1982	6 1983	7 1984	8 1985	9 1986	10 1987	11 1988	12 1989	13 1990
FUNDS FLOW													
SOURCES OF FUNDS													
NET PROFIT	-3.15	6.76	9.97	10.61	11.25	11.89	12.53	13.17	13.81	14.45	15.09	15.73	7.95
INTEREST ON LT DEB	3.56	14.23	13.16	11.73	10.31	8.89	7.47	6.04	4.62	3.20	1.78	0.36	0.00
DEPRECIATION	7.46	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	8.95
CASH INFLOW	7.87	38.89	41.03	40.24	39.46	38.68	37.90	37.11	36.33	35.55	34.77	33.99	16.90
USES OF FUNDS													
INVENTORY ADJ.	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ACCOUNTS REC. ADJ.	7.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTEREST ON LT DEB	3.56	14.23	13.16	11.73	10.31	8.89	7.47	6.04	4.62	3.20	1.78	0.36	0.00
LT LOAN REPAYMENT	0.00	0.00	14.32	14.22	14.22	14.22	14.22	14.22	14.22	14.22	14.22	14.22	0.00
CASH OUTFLOW	14.25	14.23	27.48	25.95	24.53	23.11	21.69	20.26	18.84	17.42	16.00	14.58	0.00
NET CASHFLOW	-6.38	24.66	13.55	14.29	14.93	15.57	16.21	16.85	17.49	18.13	18.77	19.41	16.90
BEGINNING CASH	9.90	3.52	28.18	41.73	56.02	70.96	86.53	102.74	119.59	137.08	155.21	173.98	193.39
ENDING CASH	3.52	28.18	41.73	56.02	70.96	86.53	102.74	119.59	137.08	155.21	173.98	193.39	210.29
DEBT SERV. COVER.:	2.21	2.73	1.49	1.55	1.61	1.67	1.75	1.83	1.93	2.04	2.17	2.33	

BALANCE SHEET AS OF THE END OF THE YEAR (DECEMBER 31)
(In \$ Million)

	1 1978	2 1979	3 1980	4 1981	5 1982	6 1983	7 1984	8 1985	9 1986	10 1987	11 1988	12 1989	13 1990
<u>BALANCE SHEET</u>													
CURRENT ASSETS													
OPERATING CASH	1.00	7.20	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	1.00	1.00
ACCOUNTS RECEIV.	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20
FIN GOODS INV.	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49
WORK IN PROCESS	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
RAW MATERIALS	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
TOTAL CURRENT	<u>16.09</u>	<u>22.38</u>	<u>22.23</u>	<u>16.09</u>	<u>16.09</u>								
SPARE PARTS	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20
GROSS FIXED ASSETS	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50
ACCUM. DEPRECIATIO	7.46	25.36	42.26	61.16	79.06	96.96	114.86	132.76	150.66	168.56	186.46	204.36	222.26
NET FIXED ASSETS	<u>222.04</u>	<u>204.14</u>	<u>187.24</u>	<u>168.34</u>	<u>150.44</u>	<u>132.54</u>	<u>114.64</u>	<u>96.74</u>	<u>78.84</u>	<u>60.94</u>	<u>43.04</u>	<u>25.14</u>	<u>16.19</u>
FUNDS FOR DISTRIB.	0.00	3.61	13.58	24.19	35.44	47.33	59.86	73.04	86.85	101.30	116.39	132.12	140.06
FUNDS FOR INVEST.	2.52	17.28	21.01	24.69	28.37	32.05	35.73	39.41	43.09	46.77	50.45	60.27	69.22
TOTAL ASSETS	<u>246.87</u>	<u>253.61</u>	<u>249.26</u>	<u>245.65</u>	<u>242.68</u>	<u>240.35</u>	<u>238.66</u>	<u>237.62</u>	<u>237.21</u>	<u>237.44</u>	<u>238.31</u>	<u>239.82</u>	<u>247.76</u>
CURRENT LIABILITIES													
ACCOUNTS PAYABLE	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
CUR PART LT DEBT	0.00	14.32	14.22	14.22	14.22	14.22	14.22	14.22	14.22	14.22	14.22	0.00	0.00
TOTAL CURRENT LIAB.	<u>0.60</u>	<u>14.92</u>	<u>14.82</u>	<u>0.60</u>	<u>0.60</u>								
LONG TERM DEBT	142.30	127.98	113.76	99.54	85.32	71.10	56.88	42.66	28.44	14.22	0.00	0.00	0.00
EQUITY													
SHARE CAPITAL	107.10	107.10	107.10	107.10	107.10	107.10	107.10	107.10	107.10	107.10	107.10	107.10	107.10
RETAINED EARNINGS	-3.15	3.61	13.58	24.19	35.44	47.33	59.86	73.04	86.85	101.30	116.39	132.12	140.06
TOTAL EQUITY	<u>103.95</u>	<u>110.71</u>	<u>120.68</u>	<u>131.29</u>	<u>142.54</u>	<u>154.43</u>	<u>166.96</u>	<u>180.14</u>	<u>193.95</u>	<u>208.40</u>	<u>223.49</u>	<u>239.22</u>	<u>247.16</u>
TOTAL LIABILITIES	<u>246.85</u>	<u>253.61</u>	<u>249.26</u>	<u>245.65</u>	<u>242.68</u>	<u>240.35</u>	<u>238.66</u>	<u>237.62</u>	<u>237.21</u>	<u>237.44</u>	<u>238.31</u>	<u>239.82</u>	<u>247.76</u>
QUICK RATIO	19.48	1.21	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	19.48	19.48
CURRENT RATIO	26.81	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	26.81	26.81
DEBT/DEBT+EQUITY %	57.79	53.62	48.52	43.12	37.44	31.53	25.41	19.15	12.79	6.39	0.00	0.00	0.00
DEBT/DEBT+SH.CAP. %	57.06	54.44	51.51	48.17	44.34	39.90	34.69	28.49	20.98	11.72	0.00	0.00	0.00

BANGLADESH-ASHUGANI FERTILIZER PROJECT
 Base Case (9.2% Financial Rate of Return)
 Financial Cost and Benefit Streams^{a/}
 (\$ Million)

Calendar Year	Operating Year	Capital Cost	Cost Streams				Benefit Streams	
			Natural Gas Cost	Other Variable Costs	Fixed Costs ^{b/}	Income Taxes	Sales Revenue	Recovered Capital
1975	-3	41.7						
1976	-2	87.8						
1977	-1	92.7						
1978 (3 mos)	1	31.0	1.5	1.7				
1979	2		5.5	6.0	2.8	0.0	10.4	-
1980	3		6.6	7.2	6.6	4.4	61.4	-
1981	4		6.6	7.2	6.6	12.2	73.7	-
1982	5		6.6	7.2	6.6	13.0	73.7	-
1983	6		6.6	7.2	6.6	13.8	73.7	-
1984	7		6.6	7.2	6.6	14.5	73.7	-
1985	8		6.6	7.2	6.6	15.3	73.7	-
1986	9		6.6	7.2	6.6	16.1	73.7	-
1987	10		6.6	7.2	6.6	16.9	73.7	-
1988	11		6.6	7.2	6.6	17.7	73.7	-
1989	12		6.6	7.2	6.6	18.4	73.7	-
1990 (6 mos)	13		3.3	3.6	3.3	19.2	73.7	-
						9.7	36.8	40.0

^{a/} Capital cost values (in mid-1978 US dollars) are taken from Annex 15 and excludes interest during construction. All other values are from the financial statements.

^{b/} Includes semi-variable costs (i.e. production bonus) but excludes depreciation.

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BANGLADESH - ASHUGANJ FERTILIZER PROJECT
FINANCIAL RATE OF RETURN AND SENSITIVITY ANALYSIS

Ex-Factory Urea Price, US\$/ton	Financial Rate of Return (%)					
	155		170		185	
	After Tax	Before Tax	After Tax	Before Tax	After Tax	Before Tax
(a) Base Case	9.2	13.8	10.3	15.9	11.5	17.8
(b) Slower Capacity Build Up ^{1/}	8.6	12.6	9.7	14.5	10.7	16.4
(c) One Year Delay in Construction	8.5	12.7	9.6	14.6	10.6	16.3
(d) Operating Cost Up 20%	8.4	12.5	9.7	14.7	10.8	16.7
(e) 20% Cost Overrun	7.2	10.8	8.3	12.7	9.3	14.5
(f) 20% Cost Overrun and One Year Delay in Construction	6.7	10.0	7.7	11.7	8.6	13.4

^{1/} Capacity utilization: Year 1 - 50%; Year 2 - 60%; Year 3 - 70%; Year 4 - 80%; 90% thereafter.

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BANGLADESH - ASHUGANJ FERTILIZER PROJECT

ECONOMIC ANALYSIS

A. Basis for Economic Analysis

1. The economic analysis is based on 1978 economic operating costs as shown in Annex 14, and a 1978 economic price of US\$175 per ton of bagged urea fertilizer. This is roughly composed of an equivalent f.o.b. (Indonesia or Persian Gulf) price of \$145 per ton (bagged), plus a freight charge of \$25 per ton and \$5 per ton for local port handling. This price is consistent with the recent Bank forecasts. No adjustments for inland freight are made since distribution costs from the port of entry and from the plant site would most likely be of the same order of magnitude. The market wage rates are assumed to be the same as the economic wage rates. Since most of the labor employed in the project are skilled or management personnel, and since the labor bill is not a large proportion of the total economic production costs, this assumption is acceptable. Import duties and the interest during construction are excluded from the economic capital costs. The official foreign exchange rate of Tk 7.50 per US dollar is used to convert local costs to foreign exchange units. Capital costs are converted to mid-1978 dollars in Annex 15.

B. The Shadow Price of Natural Gas

2. Some conceivable alternative uses of the natural gas resources will be briefly explored. The purpose of these explorations is to establish whether the natural gas is in fact a tradeable or a non-tradeable (directly or indirectly) commodity. This is the crucial aspect that will determine the shadow price of the natural gas.

3. Five alternative uses of the natural gas are considered. Each alternative implies a different basis for deriving the shadow price for the natural gas. These bases (the alternative use is implied) are listed below. The first four treat gas as a tradeable commodity. The fifth imply that natural gas is not a tradeable commodity.

Alternative Bases for the Shadow Price of Natural Gas

- a. At the opportunity cost as liquefied natural gas (LNG) for export.
- b. At the opportunity cost of natural gas exported to India through a pipeline.
- c. At the price of the energy equivalent to crude oil (or its fuel derivatives), specifically as industrial fuel.
- d. At the opportunity cost as feedstock for a urea fertilizer plant specifically for the export market, as opposed to the domestic market.
- e. At the (natural gas) producer's price (or cost plus a reasonable profit) plus transmission charges, implying the gas is not a tradeable commodity.

4. For reasons discussed in the next section it may be more appropriate to use alternative (a) as a basis for the natural gas shadow price. Essentially, natural gas is to be treated as a non-tradeable commodity. The opportunity cost should then be the market price, excluding excise duties. As of March 1977, the natural gas price had the following component per MSCF:

a. Well-head (producer's) price	Tk 0.50
b. Transmission charges	Tk 0.70
c. Excise duty	Tk 0.40
Total	<u>Tk 1.60</u>

5. The Titas Gas Transmission Company (a public corporation), has just proposed raising the transmission charges to Tk 1.42 per MSCF. This was subsequently approved by the Government. For purposes of this project however, a delivered cost of Tk 3.72 per MSCF (60% higher than the new price) was suggested by the Government. No breakdown of the excise duty component was projected. Since the Government sets the gas price, owns the transmission company, and is part owner of the gasfields, it is difficult to estimate the economic or even the market price of gas. Hence it will be assumed that the economic price is identical to the financial price of Tk 3.72 (US\$0.50) per MSCF.

6. The transmission charges are relatively high, considering that the plant site is only about 7 miles from the Titas gasfields. In addition, the existing high pressure main pipeline is approximately one mile from the plant location. This pipeline is only about 35% utilized at the moment and is not expected to be fully utilized in the near future, even with the additional load from the project. Consequently, a one-mile spur from the main pipeline to the factory, should at first glance, not cost (financially or economically) as much as the proposed transmission charges would imply.

7. The transmission charges however, are levied irrespective of distance, and is supposed to be the average rate necessary for the transmission company to provide and expand its services (at a fair return on investment). A flat rate of course, can be interpreted to imply a subsidy by the short distance users to the long distance users. This need not be the economic interpretation. The Government may wish to encourage a regionally balanced development. Consequently, charging based on the distance transmitted may not be the appropriate basis for deriving economic costs.

8. The fact that there is substantial unused capacity in the main gas pipeline is not a reason for reducing the shadow price below the market price either. For economic analysis, pipeline capacity ought not to be treated as a surplus commodity. The nature of the pipeline business and technology dictate that these facilities be designed with the future requirements in mind, and not with the present volume of demand. Pipeline capacity cannot be continuously expanded with each increase in demand. Rather, expansion is by large capacity increments. Thus, it is not unusual for pipelines to have excess capacity.

8. Rationale for Treating Gas as a Non-Tradeable Commodity 1/

9. Exporting natural gas as LNG or as piped gas to India do not appear to be viable economic alternatives. There are three main reasons for this:

- a. The volume of natural gas reserves that must be dedicated to such projects may exceed what Bangladesh can commit without adversely affecting the supply available for currently known or committed domestic consumption in the foreseeable future. Although the proven national gas reserves are very much in excess of presently committed domestic consumption, the surplus is not sufficiently large to support a very large project without preempting other industrial uses or present commitments which have only modest gas requirements. Thus, the strategy for developing the gas resource ought to concentrate on projects with more modest gas requirements as opposed to say, an LNG facility.
- b. Bangladesh would be in a comparative cost disadvantage in the LNG international market for reasons of high capital costs and transportation distances. Thus, even small surpluses in the world supply would affect Bangladesh more adversely than other producers.

The proven reserves of the individual Bangladesh gasfields are not large enough to supply an LNG facility. Consequently, several gasfields have to be pooled together through pipelines. The multitude of river systems, soil characteristics and shifting river paths pose difficult engineering problems. A reliable pipeline system may not be feasible or could be very expensive. The India industrial centers are far from the Bangladesh gasfields--making a transmission project prohibitively expensive. Bangladesh is also not favorably located to the Asian LNG market relative to Indonesia, or to the US and European markets, relative to the Persian Gulf and the North African countries. These factors tend to make an export project financially and economically untenable.

- c. These types of projects require long-term supply and pricing contracts which are inherently difficult to negotiate and which Bangladesh may not be in a good position to conclude favorably.

1/ Except after transformation to urea fertilizer.

10. An energy price, equivalent to the crude oil price of say \$ 9-10 per barrel is also not an appropriate basis for the shadow price of natural gas. Bangladesh will not import any additional crude oil or fuels as a result of the proposed fertilizer project. Furthermore, almost all economically and technically feasible substitution of gas for fuel oil has been made.

11. If the opposite assumption that the gas is a tradeable commodity is taken, then the gas will have to be priced at an energy basis of US\$ 1.40 per million BTU, which is equivalent to about US\$ 9-10 per barrel of crude oil. At US\$ 1.40 per million BTU, the Titas gas will be priced at about US\$ 1.31 per MSCF as the average lower heating value for Titas gas is 938 BTU per SCF of gas.

12. Using an export oriented urea fertilizer project as a basis for the shadow price of natural gas is not appropriate. This approach actually begs the question of the shadow price for natural gas. Alternative uses of the natural gas are as feedstock to a fertilizer plant, as feedstock to an LNG or petrochemical plant, as fuel for thermal power plants, as fuel for households, as fuel for industry, etc. The export or domestic consumption of urea fertilizer is an alternative use of the urea fertilizer and not an alternative use of the gas. In other words, the proposed project will use gas as feedstock for urea fertilizer production. The alternative use for deriving a shadow price for the gas ought not be as feedstock to a urea fertilizer project too.

13. Since Bangladesh is an importer of urea fertilizer at present, and is expected to continue importing urea fertilizer if this project is not undertaken, then it is rather dubious to consider an export oriented fertilizer project as a meaningful alternative. It is only when the country is more or less self-sufficient in urea fertilizer that an export oriented fertilizer project becomes a sensible alternative. Thus, the proposed project is in fact a necessary condition for an export oriented fertilizer plant to become an alternative use of the gas resources.

14. The preceding comments suggest that, as far as this proposed fertilizer project is concerned, alternative uses for the natural gas are limited to the domestic market. That is, the gas is more appropriately considered as a non-tradeable, rather than a tradeable commodity.

BANGLADESH-ASHUGANJ FERTILIZER PROJECT
 BASE CASE (21.2 ECONOMIC RATE OF RETURN)
 ECONOMIC COST AND BENEFIT STREAMS
 (\$ MILLION)

Calendar Year	Operating Year	Cost Streams ^{a/}				Benefit Streams	
		Capital Costs	Natural Gas Cost	Other Variable Costs	Fixed Costs ^{b/}	Economic Value of Production ^{c/}	Revenue ^{c/}
1975	-3	34.0					
1976	-2	71.8					
1977	-1	76.1					
1978 (5mos)	1	28.2					
1979	2		1.5	1.1	2.3	19.2	-
1980	3		5.5	3.9	5.6	69.3	-
1981	4		6.6	4.7	5.6	83.2	-
1982	5		6.6	4.7	5.6	83.2	-
1983	6		6.6	4.7	5.6	83.2	-
1984	7		6.6	4.7	5.6	83.2	-
1985	8		6.6	4.7	5.6	83.2	-
1986	9		6.6	4.7	5.6	83.2	-
1987	10		6.6	4.7	5.6	83.2	-
1988	11		6.6	4.7	5.6	83.2	-
1989	12		6.6	4.7	5.6	83.2	-
1990 (6 mos)	13		3.3	2.4	2.8	41.6	38.9

^{a/} Operating costs are taken from Annex 14. Capital costs are from Annex 15. In addition, the interest during construction and the import duties (\$63.9 million) have been excluded. The total economic capital cost is \$210.1 million with a foreign exchange component of \$160.9 million (in mid-1978 US dollars).

^{b/} Includes semi-variable costs (i.e. production bonus).

^{c/} Based on economic price of \$175 per metric ton.

Industrial Projects Department
 November 1974

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

ECONOMIC RATE OF RETURN AND SENSITIVITY ANALYSES

Urea Economic Price, US\$/ton	Economic Rate of Return (%) at Different Economic Prices for Urea Fertilizer (US \$/Metric Ton, Bagged)		
	155	175 ^{1/}	195
A. Base Case	18.2%	21.2%	24.0%
B. Operating Cost Up 20%	17.0%	20.2%	23.0%
C. Slower Capacity Build-Up ^{2/}	16.6%	19.4%	22.0%
D. One Year Delay in Construction	16.6%	19.2%	21.6%
E. 20% Cost Overrun ^{3/}	14.8%	17.6%	20.2%
F. 20% Cost Overrun and One Year Delay in Construction	13.6%	16.0%	18.4%
G. Economic Cost of Gas at \$1.31 per MSCF	14.6%	17.8%	20.8%
H. Shadow Exchange Rate Tk 14.00 = U.S. \$1.00	22.0%	25.0%	27.8%

^{1/} Composed of f.o.b. \$145 plus ocean freight of \$25 plus local port handling of \$5 per ton (the c.i.f. price is \$170 per ton).

^{2/} Capacity build-up as follows:

Operating Year 1 (5 mos.)	= 50% of rated capacity
Operating Year 2	= 60% of rated capacity
Operating Year 3	= 70% of rated capacity
Operating Year 4	= 80% of rated capacity
Operating Years 5-12	= 90% of rated capacity

^{3/} Economic Costs: Foreign Exchange = 193.1 million
Local Currency = 59.0 million

Total 252.1 million

BANGLADESH-ASHUGANJ FERTILIZER PROJECT

ANNUAL FOREIGN EXCHANGE SAVINGS AND
THE EFFICIENCY OF IMPORT SUBSTITUTION^{1/}

	<u>Cost/Ton</u> <u>(\$)</u>	<u>Annual Cost</u> <u>(\$ Million)</u>
<u>I. ECONOMIC PRODUCTION COSTS (AT MID-1978 PRICES)</u> ^{2/}		
<u>A. Foreign Exchange Component</u>		
<u>Variable Costs:</u>		
1. Catalysts and Chemicals	1.56	0.7
2. P. E. Chips for Bags	7.88	3.8
<u>Fixed Costs:</u>		
1. Maintenance Materials	5.26	2.5
Total Foreign Exchange Component	<u>14.70</u>	<u>7.0</u>
<u>B. Local Currency Component</u>		
<u>Variable Costs:</u>		
1. Natural Gas	13.90	6.6
2. Local Costs on P.E. Chips and Chemicals	0.40	0.2
<u>Fixed and Semi-Variable Costs:</u>		
1. Local Costs on Maintenance Materials	0.21	0.1
2. Wages, Benefits, Overhead and Insurance	6.37	3.0
Total Local Currency Component	<u>20.88</u>	<u>9.9</u>
<u>C. Total Economic Production Cost</u>	<u>35.58</u>	<u>16.9</u>
<u>II. VALUE OF ANNUAL PRODUCTION (90% CAPACITY AT CIF COST OF \$170/TON)^{3/}</u>	170.00	80.8
<u>III. GROSS FOREIGN EXCHANGE SAVINGS AT CIF OF \$170 PER TON OF UREA EXCLUDING CAPITAL CHARGES (II LESS I-A)</u>	155.3	73.9
A. If CIF Cost is \$150/ton of Urea	135.3	64.3
B. If CIF Cost is \$190/ton of Urea	175.3	83.3

^{1/} Based on 90% capacity utilization.

^{2/} Taken from Annex 14.

^{3/} Based on an FOB price of US\$115 plus ocean freight of US\$25 per ton of urea. US\$5 per ton for local port handling is added to the CIF cost of US\$170 to arrive at the economic price of urea.

PAKISTAN-ASUGANI FERTILIZER PROJECTINTEREST DURING CONSTRUCTION

Total Debt: US\$ 112.3 million

For AFCC, the debt of \$ 112.3 million represents 57% of the total project cost (including interest during construction) of US\$ 219.4 million.

Interest Rate: 10% per year.

Disbursement:

	<u>%</u>	<u>US\$ million</u>
At end of year 1 (1975)	15%	21.4
At end of year 2		49.8
At end of year 3	40%	56.9
At end of year 4 (9 months)	<u>10%</u>	<u>11.2</u>
	100%	112.3

At End of Year:

	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>Total</u>
1. Already Drawn	0	21.40	71.20	128.10	
2. Previous Years' Interest	0	1.07	4.74	10.43	
3. Opening Debt (1 + 2)	0	22.47	75.94	138.53	
4. Interest on Opening Debt (10%)	0	2.25	7.59	10.39	
5. Drawn During Year	21.40	49.80	56.90	11.20	
6. Interest on Current Drawings (5%)	1.07	2.49	2.81	0.53	
7. Total Interest for Year (4 + 6)	1.07	4.74	10.43	10.92	27.16
8. Assumed Interest during Construction	<u>1.1</u>	<u>4.6</u>	<u>10.4</u>	<u>10.9</u>	<u>27.2</u>

Industrial Projects Department
November 1974

(NOTE: Table of contents and titles of Sections to be added upon finalization of copy.)

DRAGL
AID/ASSURANT
November 7, 1

ANNEX 2

LOAN AGREEMENT dated _____, between the
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH ("Government")
and the UNITED STATES OF AMERICA acting through the AGENCY FOR
INTERNATIONAL DEVELOPMENT ("A.I.D.").

ARTICLE I

The Loan

SECTION 1.01 The Loan. Subject to the terms and conditions of this Agreement, A.I.D. hereby agrees to lend to the Government pursuant to the Foreign Assistance Act of 1961, as amended, an amount not to exceed Thirty Million United States Dollars (\$30,000,000) ("the Loan") to assist the Government in carrying out the Project referred to in Section 1.02 ("Project"). The Loan shall be used exclusively to finance the foreign exchange costs of goods and services required for the "Project". The aggregate amount of disbursements under the Loan is hereinafter referred to as "Principal". The commodities and services authorized to be financed hereunder are hereinafter referred to as "Eligible Items". A.I.D., may decline to finance any Eligible Item when, in its judgment, said financing would be inconsistent with the purposes of the Loan or in violation of the legislation or regulations governing A.I.D.

SECTION 1.02 The Project. The "Project", to be carried out with resources of the Government together with resources made available to the Government by the International Development Association, the Federal Republic of Germany, the Government of Switzerland, the United

Kingdom of Great Britain and Northern Ireland, the Asian Development Bank (collectively referred to herein as "Other Lenders") and the United States of America, all of which will be made available to the Ashuganj Fertilizer and Chemical Company Limited ("AFCC"), shall be the construction and operation of a urea fertilizer plant and all appropriate ancillary facilities at Ashuganj, Comilla, Bangladesh, together with the provision of management and consultants' services and training, all as described in more detail in the Project Description attached hereto as Annex I. Said Annex I is a part of this agreement and may, within the terms of this Agreement, be modified in writing by the parties hereto.

SECTION 1.03. The allocation of the proceeds of the loan among the expenditures on the Project, the goods to be financed from such proceeds and the methods and procedures for procurement of such goods shall be determined by agreement between the Government and A.I.D.

ARTICLE II

DEFINITIONS

SECTION 2.01. Wherever used in this Loan Agreement the following terms have the following meanings:

- (a) "BFCCPC" means the Bangladesh Fertilizer, Chemical and Pharmaceutical Corporation, a corporation established and operating under the laws of the Government and wholly owned by the Government;
- (b) "AFCC" means the Ashuganj Fertilizer and Chemical Company, Limited;
- (c) "Project Agreement" means the agreement between A.I.D. and AFCC, referred to in Section 4.02(b) of this Loan Agreement;
- (d) "Financing Agreement" means the agreement between the Government and AFCC referred to in Section 4.02(c) of this Loan Agreement;
- (e) "TGTDC" means the Titas Gas Transmission and Distribution Company Limited, a company established and operating under the laws of Bangladesh and wholly owned by the Government;
- (f) "Plant" means the Plant described in Annex 1 to this Agreement;
- (g) "Gas Supply Agreement" means the agreement dated _____ 1974 between AFCC and TGTDC for the supply of natural gas required for the operation of the Plant and for the construction of a pipeline to the site of the Plant;
- (h) "Commercial Operation Date" means the date/as of which the Plant has produced eighty per cent of its rated urea capacity (in the aggregate for a sixty -day period without allowance for shutdown for _____ of the first day

maintenance) for a period of sixty consecutive days;

(i) "Other Lenders" means those financiers listed in Section 4.02(a) and, except as A.I.D. shall otherwise agree, any other international or governmental institution (other than the Government or an agency of the Government) which makes funds available to the Government or AFCC for purposes of the Project;

(j) "Other Loan Agreements" means the various agreements between the Government and the Other Lenders whereby the Other Lenders have agreed to make available funds to the Government or AFCC for the purposes of the Project; and

(k) "Foreign Currency" means any currency other than the currency of the Country of the Government.

ARTICLE III

Loan Terms

SECTION 3.01. Interest. The Government shall pay interest to A.I.D. which shall accrue at the rate of two percent (2%) per annum for ten years following the date of the first disbursement hereunder and at the rate of three percent (3%) per annum thereafter on the outstanding balance of Principal and on any due and unpaid interest thereon. Interest on the outstanding balance shall accrue from the date of each respective disbursement (as such date is defined in Section 3.04) and shall be computed on the basis of a 365-day year. Interest shall be payable semi-annually. The first payment of interest shall be due and payable no later than six (6) months after the first disbursement hereunder, on a date to be specified by A.I.D.

SECTION 3.02. Repayment. The Government shall repay the Principal to A.I.D. within forty (40) years from the date of the first disbursement hereunder in sixty-one (61) approximately equal semiannual installments of Principal and Interest. The first installment of Principal shall be payable nine and one-half (9½) years after the date on which the first interest payment is due in accordance with Section 3.01. A.I.D. shall provide the Government with an amortization schedule in accordance with this Section after the final disbursement under the Loan.

SECTION 3.03. Application, Currency, and Place of Payment.

All payments of Interest and Principal hereunder shall be made in United States dollars and shall be applied first to the payment of interest due and then to the repayment of Principal. Except as A.I.D. may otherwise specify in writing, all such payments shall be made to the Controller, Agency for International Development, Washington, D. C., U.S.A., and shall be deemed made when received by the Office of the Controller.

SECTION 3.04. Prepayment. Upon payment of all interest and refunds then due, the Government may prepay, without penalty, all or any part of the Principal. Any such prepayment shall be applied to the instalments of Principal in the inverse order of their maturity.

SECTION 3.05. Renegotiation of the Terms of the Loan. The Government agrees to negotiate with A.I.D., at such time or times as A.I.D. may request an acceleration of the repayment of the Loan in the event that there is any significant improvement in the internal and external economic and financial position and prospects of the country of the Government (taking into consideration the relative capital requirements of Bangladesh).

ARTICLE IV

Conditions Precedent to Disbursement

SECTION 4.01. Initial Conditions Precedent to Disbursement.

Within forty-five (45) days after signing of this agreement, or such other time as A.I.D. may agree, the Government shall furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) An opinion of the Ministry of Law of Bangladesh or other counsel acceptable to A.I.D. that this Agreement has been duly authorized or ratified by and executed on behalf of the Government, and that it constitutes a valid and legally binding obligation of the Government;

(b) Evidence of the authority of the person or persons who will act as the representative or representatives of the Government as specified in Section 10.03 and a specimen signature of each such person certified as to its authenticity by either the person rendering the legal opinion required by sub-section (a) above or the person who has executed this Agreement for the Government.

SECTION 4.02. Additional Conditions Precedent to Disbursement.

Prior to the first disbursement or to the issuance of the first letter of commitment under the Loan, the Government shall, except as A.I.D. may agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) Evidence that the Government has entered into agreements satisfactory to A.I.D. with the Other Lenders for financing of the Project in the following amounts:

<u>Other Lenders</u>		<u>Amounts</u>
International Development Association	-	US \$33 Million
United Kingdom of Great Britain and Northern Ireland	-	£ Stg 8 Million
Federal Republic of Germany	-	DM 30 Million
Government of Switzerland	-	SFr 20 Million
Asian Development Bank	-	US \$ 30 Million
United Nations Development Programme	-	US \$ 6.6 Million

and that all conditions precedent to the effectiveness of the agreement with the International Development Association have been met.

(b) Evidence that the Project Agreement executed on behalf of AFCC shall have been duly authorized or ratified by all necessary corporate, administrative and governmental action;

(c) Evidence that the Financing Agreement shall have been duly executed and delivered on behalf of the Government and AFCC and shall have become fully effective and binding on such parties in accordance with its terms, subject only to the effectiveness of the Loan Agreement;

(d) Evidence that the Gas Supply Agreement shall have been duly executed and delivered and shall have become fully effective and binding on the parties thereto;

(e) Evidence that the Government shall have dedicated and made available for the operation of the Plant not less than eight billion cubic meters of the natural gas reserves of the Titas gas field;

(f) Evidence that AFCC shall have acquired all lands and properties and all rights, easements, privileges and approvals pertaining to such lands and properties as shall be necessary or appropriate to enable AFCC to undertake the construction of the Plant;

(g) Evidence that BFCPC shall have executed a proper and valid assignment to AFCC of its rights and obligations under any (including the contracts for Plant site preparation and for technical advisers contracts which relate to the Project/and BFCPC and AFCC shall have to prepare completed a financial settlement satisfactory to A.I.D. whereby all Project implementation due and proper financial disbursements or liabilities made or incurred by BFCPC in respect of the formation of AFCC and the initial preparatory action in respect of the Project shall have been reimbursed to BFCPC;

(h) Evidence that the Managing Director of AFCC shall have been duly appointed and his authority to act pursuant to Section _____ of the Project Agreement shall have been established;

(i) Evidence that AFCC shall have made arrangements satisfactory to A.I.D. to obtain the services of the consultants referred to in Section _____ of the Project Agreement;

(j) Evidence that the Government has taken action
satisfactory to A.I.D. to insure⁽¹⁾/issuance of necessary import licenses
and⁽²⁾/provision of foreign exchange (including the timely availability
thereof) in appropriate amounts to assure^{that}/continuity of the operation
of the Plant and of other Government owned fertilizer plants is not
interrupted due to the unavailability of spare parts and stores within
the territory of the Government.

(k) Evidence that the Government has taken action satisfactory
to A.I.D. to facilitate the entry of goods for the Project into
Bangladesh and their delivery to the Plant site with respect^{to}/payment
of customs duties through procedures designed to ensure immediate release
of such goods from customs.

(l) Evidence that the Government has taken action satisfactory
to A.I.D. to facilitate delivery of imported goods required for the
Project to the Plant site with respect to inland water transportation
by use of appropriate cargo vessels in a timely manner.

(m) Evidence that the Government has taken action satisfactory
to A.I.D. to assure the prompt approval of Project related contract
documentation and actions within the Government.

(n) Evidence that adequate management /^{capability} and personnel have
been secured for AFCC, that the Directors thereof are persons of
appropriate experience and qualifications and that the Managing Director
is a highly competent executive with demonstrated management capability
in managing large operations or companies.

(o) Evidence that as of the date on which all other conditions precedent contained in this Section are fulfilled with the exception of sub-paragraph (a) of this Section, AFCC is in compliance with its obligations pursuant to the contract with Vinnell Corporation for site preparation.

(p) Evidence that the Government has developed, satisfactory to A.I.D., the scope and detail of the study referred to in Section 5.05(c) hereof.

(q) A budget, approved by the Government, showing planned expenditures for goods and services (disaggregating personnel covered) beginning with the date of commencement of AFCC's business and ending with the anticipated Commercial Operation Date, broken down by months for the first twelve months and by years thereafter and showing the proportions of all such expenditures expected to be made in currency other than that of the Government.

(r) (Reserved for possible condition regarding Marketing, Distribution and Pricing)

SECTION 4.03. Terminal Dates for Meeting Conditions Precedent to Disbursement.

(a) If all of the conditions specified in Section 4.01 shall not have been met within forty-five (45) days from the date of this Agreement, or such later date as A.I.D. may agree to in writing, A.I.D., at its option, may terminate this Agreement by giving written notice to the Government. Upon giving of such notice, this Agreement and all obligations of the parties thereunder shall terminate.

(b) Except as A.I.D. may otherwise agree in writing, if all of the conditions specified in Section 4.02 have not been satisfied on or before March 31, 1975, A.I.D., at its option, may terminate this Agreement by giving written notice to the Government. Upon giving of such notice,

this Agreement and all obligations of the parties hereunder shall terminate.

SECTION 4.04. Notification of Meeting Conditions Precedent to Disbursement. A.I.D, shall notify the Borrower upon determination by A.I.D. that the conditions precedent to disbursement specified in Section 4.01 and 4.02 have been met.

ARTICLE V

Convenants

SECTION 5.01. Covenants. The Government, in consideration of this Loan, hereby convenants and warrants that:

(a) The Government shall cause AFCC to carry out the Project and to manage and operate the Plant with due diligence and efficiency, and in conformity with sound administrative, financial, engineering and industrial practices applicable from time to time to the fertilizer industry, and shall not take or permit any action which would interfere with AFCC's obligations under the Project Agreement.

(b) The Government shall make available or cause to be made available to AFCC, promptly as needed, and on terms and conditions acceptable to A.I.D., the land, funds, facilities, services, personnel and other resources which are required, in addition to the proceeds of the Loan and the funds made available by the Other Lenders, for the carrying out of the Project and the operation of the Plant. For purposes of this Section no prior concurrence is contemplated and A.I.D. shall not deem unacceptable any term or condition of the employment of personnel which is in accordance with the laws and regulations of the Government.

(c) The Government will cause AFCC to operate as an independent business entity on strictly commercial principles and will permit AFCC to manage its own activities, business and affairs, all pursuant to the authority and terms of its Memorandum and Articles of Association.

(d) The Government shall ensure that the activities of its departments and agencies with respect to the carrying out of the Project and the operation of the Plant are conducted and coordinated in such a way as will ensure the due and proper implementation of the Project.

(e) The Government and A.I.D. shall cooperate fully to assure that the Project will be accomplished. To this end, the Government and A.I.D. shall from time to time, at the request of either party, exchange views through their representatives with regard to the progress of the Project, the performance of the Government of its obligations under this Agreement, the performance of contractors and suppliers engaged in the Project, and other matters relating to the Project.

(f) (i) The Government in connection with obtaining the Loan, or taking any action under or with respect to this Agreement, has not paid, and will not pay or agree to pay, nor to the best of its knowledge has there been paid nor will there be paid or agreed to be paid by any person or entity, commissions, fees or other payments of any kind, except as regular compensation for bona fide professional technical or comparable services. The Government shall promptly report to A.I.D. any payment or agreement to pay for such bona fide professional, technical, or comparable services to which it is a party, or of which it has knowledge (indicating whether such payment has been made or is to be made on a contingent basis), and if the amount of any such payment is deemed unreasonable by A.I.D., the same shall be adjusted in a manner satisfactory to A.I.D.

(ii) No payments have been or will be received by the Government, or any official of the Government, in connection with the procurement of goods and services financed hereunder, except fees, taxes or similar payments legally established in Bangladesh.

(g) The Government has disclosed to A.I.D. all circumstances

which may materially affect the Project or the discharge of Government's obligations under this Agreement and will inform A.I.D. of any conditions which interfere, or which it is reasonable to believe will interfere, with the Project or the discharge of the Government's obligations under this Agreement.

SECTION 5.02. (a) The Government shall make the proceeds of the Loan, together with funds made available for purposes of the Project by the Other Lenders and all other funds required for the Project, available to AFCC under a Financing Agreement upon terms and conditions satisfactory to A.I.D. Except as A.I.D. shall otherwise agree, the funds to be made available by A.I.D. and the Other Lenders shall be lent to AFCC on, inter alia, the following terms and conditions:

- (i) interest at the rate of ten percent (10%) per year;
- (ii) equal semi-annual repayments of principal and interest over a ten-year period following a five-year grace period as to principal; and
- (iii) acceptance of the foreign exchange risk by AFCC with respect to outstanding amounts.

Funds made available to AFCC by the Government from other resources shall be provided to AFCC in exchange for its shares; provided, however, that on and after the Commercial Operation Date such

funds may be relent by the Government on terms and conditions, including those set forth in (i)-(iii) above, which are satisfactory to A.I.D., to the extent that AFCC's debt-equity ratio would be not more than 1.5:1 subsequent to such relending.

(b) The Government shall cause AFCC to apply the proceeds of the Loan to the financing of expenditures on the Project in accordance with the provisions of this Loan Agreement and the Project Agreement.

SECTION 5.03. Financing Agreement. (a) The Government shall exercise its rights under the Financing Agreement in such a manner as to protect the interests of the Government and A.I.D. and to accomplish the purposes of the Loan.

(b) No rights or obligations under the Financing Agreement shall be assigned, amended, abrogated or waived by the Government without the prior concurrence of A.I.D.

SECTION 5.04. Funds and other Resources to be Provided by Government. The Government herein agrees to provide promptly as needed all funds, including both local and foreign currencies, in addition to the Loan, and all other resources required for the practical and effective carrying out of the Project.

SECTION 5.05. The Government shall, promptly and to the satisfaction of A.I.D., take all necessary measures to build up and maintain through the Bangladesh Agricultural Development Corporation (BADC) or otherwise, an effective and economic marketing and distribution organization for fertilizer produced in Bangladesh and to promote the

sale of such fertilizer at prices determined in accordance with sound commercial practice and consistent with the terms of the Project Agreement. To this end, the Government shall:

(a) carry out or cause to be carried out a fertilizer distribution and marketing study, the scope and detail of which shall be acceptable to A.I.D., whereby institutional and procedural improvements in the marketing and distribution of fertilizer and an investment program for effecting capital improvements will be formulated. Such study shall, except as A.I.D. shall otherwise agree, be completed not later than June 30, 1975; and

(b) within two months after the completion of such study, furnish A.I.D. with its proposals for a program to improve fertilizer distribution and marketing and, after consultation with A.I.D. concerning such proposals, implement a program acceptable to the A.I.D. to improve fertilizer distribution and marketing in sufficient time to ensure the efficient distribution and marketing of fertilizer produced by the Plant.

SECTION 5.06. (a) The Government shall take, or cause to be taken, the action required to improve production of the existing fertilizer plants at Ghorasal, Chittagong and Fenchuganj to a reasonable level, taking into account the views of A.I.D. on this subject.

(b) The Government shall employ, or cause to be employed, a consultant whose primary responsibility will be to assist BFCPC and AFCC in establishing by June 30, 1976, or such later date as A.I.D. may agree, a uniform system of inventory control for spare parts and consumable stores required for the operation of fertilizer plants by BFCPC and for the operation of the Plant by AFCC.

SECTION 5.07. The Government shall take, or cause to be taken, such action as is required to ensure that:

(a) not less than eight billion cubic meters of the natural gas reserves of the Titas gas field are dedicated and made available to AFCC for the operation of the Plant; and

(b) TGTDC shall supply AFCC with the natural gas required for the operation of the Plant and shall complete construction of a natural gas pipeline to the Plant from the existing Titas-Ashuganj pipeline by not later than 30 June 1977, or such later date as A.I.D. may agree, in accordance with the provisions of the Gas Supply Agreement.

SECTION 5.08. If an electrical power generating facility of sufficient capacity to supply the entire needs of the Plant is not included within the Plant, the Government shall cause the Bangladesh Power Development Board and AFCC to enter into a contract, on terms and conditions satisfactory to A.I.D., not later than 31 December 1975, for the long-term supply of the electrical power necessary for the operation of the Plant, and the Government shall exert its best

efforts to assist the Bangladesh Power Development Board in carrying out its obligations under such contract.

SECTION 5.09. It is the mutual intention of the Government and A.I.D. that no other external debt owed a creditor other than A.I.D. shall enjoy any priority over the Loan by way of a lien on governmental assets. To that end, the Government undertakes that, except as A.I.D. shall otherwise agree, if any lien shall be created on any assets of the Government as security for any external debt, such lien will ipso facto equally and ratably secure the payment of the principal of, and services charge and other charges on, the Loan, and that in the creation of any such lien express provision will be made to that effect; provided, however, that the foregoing provisions of this Section shall not apply to: (i) any lien created on property, at the time of purchase thereof, solely as security for the payment of the purchase price of such property; or (ii) any lien arising in the ordinary course of banking transactions and securing a debt maturing not more than one year after its use.

The term "assets of the Government" as used in this Section includes assets of the Government and assets of any agency of the Government, including the Bangladesh Bank and any other institution performing the functions of a central bank for the Government.

SECTION 5.10. Change in Management of AFCC. Prior to making any change in the position of the Chairman or Managing Director of AFCC, the Borrower shall inform the AID of its proposal to make such nomination, furnishing such information as to the qualifications and experience of the proposed nominee as the AID shall reasonably request and shall afford the A.I.D. sufficient opportunity to consult with the Borrower prior to making such nomination.

ARTICLE VI

Records, Reports and Inspection

SECTION 6.01. Maintenance and Audit of Records. The Government shall cause to be maintained, in accordance with sound accounting principles and practices consistently applied, books and records relating both to the Project and to the Loan. Such books and records shall, without limitation, be adequate to show:

(a) the receipt and use made of goods and services acquired for the Project with funds disbursed pursuant to Agreements with A.I.D. and other lenders;

(b) the nature and extent of solicitations of prospective suppliers of goods and services acquired;

(c) the basis of the award of contracts and orders to successful bidders; and

(d) the progress of the Project.

||<----- Such books and records shall be regularly audited, in accordance with standard Government auditing procedures, except as A.I.D. may otherwise agree in writing, and shall be maintained for three (3) years after the date of the final disbursement hereunder.

SECTION 6.02. Reports.

(a) The Government shall furnish or cause to be furnished to A.I.D. all such information as A.I.D. shall reasonably request concerning (i) the Loan and the expenditure of the proceeds and maintenance of the service thereof; (ii) the goods financed out of the proceeds of the Loan; (iii) the Project and the Plant; (iv) the

administration, operations and financial condition of AFCC, and any agencies of the Government responsible for carrying out the Project or any part thereof or the operation of the Plant; (v) financial and economic conditions in the territories of the Government and the international balance of payments position of the Government; (vi) the policies of the Government concerning fertilizer supply, credit, marketing and use within its territories; and (vii) other matters relating to the purposes of the Loan.

(b) The Government shall promptly notify A.I.D. of any conditions which may interfere with carrying out the Project.

SECTION 6.03. Inspections. The authorized representatives of A.I.D. shall have the right at all reasonable times to observe the operation of the Project and inspect the utilization of all goods and services financed hereunder, and the Government's books, records, and other documents relating to the Project, the Loan and the Financing Agreement. The Government shall cooperate with A.I.D. to facilitate such inspections and shall permit representatives of A.I.D. to visit any part of the country of the Government for any purpose related to the Loan.

ARTICLE VII

Procurement

SECTION 7.01. Procurement from the United States and Code P-1 Countries. Except as A.I.D. may otherwise agree in writing, disbursements made pursuant to Section 8.01 and 8.02 shall be used exclusively to finance the procurement for the Project of goods and services, and marine insurance having both their source and origin in the United States of America or countries included in Code 941 of the A.I.D. Geographic Code Book as in effect at the time of such procurement.

SECTION 7.02. Eligibility Dates. Except as A.I.D. may otherwise agree in writing, no goods or services may be financed under the Loan which are procured pursuant to orders or contracts firmly placed or entered into prior to the signing of this Agreement, provided however, that the site preparation contract with Vinnell Corporation shall be eligible for financing even though entered into prior to such signing.

SECTION 7.03. Approval of Contracts and Other Documents. Except as A.I.D. may otherwise agree in writing, all bid documents and documents related to the solicitation of proposals related to Eligible Items shall be approved by A.I.D. in writing prior to their issuance. Except as A.I.D. may otherwise specify in Implementation Letters, all contracts or amendments thereto shall be approved by A.I.D. in writing prior to their execution.

SECTION 7.04. Shipping and Insurance.

(a) Goods financed under the Loan shall be transported to Bangladesh on flag carriers of any country included in Code 935 of

the A.I.D. Geographic Code Book as in effect at the time of shipment, provided,

(i) At least fifty percent (50% of the gross tonnage of all commodities (computed separately for dry bulk carriers, dry cargo liners and tankers) financed hereunder which may be transported on ocean vessels shall be transported on privately-owned United States-flag commercial vessels.

(ii) Additionally, at least fifty percent (50%) of the gross freight revenue generated by all shipments financed hereunder and transported to Bangladesh on dry cargo liners shall be paid to or for the benefit of privately-owned United States-flag commercial vessels.

(iii) Compliance with the requirements of (i) and (ii) above must be achieved with respect to cargo transported from U.S. ports and also to cargo transported from non-U.S. ports, computed separately.

(iv) Within ninety (90) days following the end of each calendar quarter, or such other period as A.I.D. may specify in writing, the Government shall furnish A.I.D. with a statement, in form and substance satisfactory to A.I.D., reporting on compliance with the requirements of this Section.

(v) No such goods may be transported on any ocean vessel (or aircraft) which A.I.D., in a notice to the Government, has designated as ineligible to carry A.I.D.-financed goods or which has been chartered for the carriage of A.I.D.-financed goods unless such charter has been approved by A.I.D.

(b) If, in connection with the placement of marine insurance on shipments to be financed hereunder the Government, by statute, decree, rule, or regulation, favors any marine insurance company of any country over any marine insurance company authorized to do business in any state of the United States of America, goods procured from the United States and financed under the Loan shall, during the continuance of such discrimination, be insured against marine risk in the United States of America with a company or companies authorized to do a marine insurance business in any state of the United States of America.

(c) The Government shall insure, or cause to be insured, all goods financed under the Loan against risks incident to their transit to the point of their use. Such insurance shall be issued upon terms and conditions consistent with sound commercial practice, shall insure the full value of the goods, and shall be payable in the currency in which such goods were financed. Any indemnification received by the Government under such insurance shall be used to replace or repair any material damage or any loss of the goods insured or shall be used to reimburse the Government for the replacement or repair of such goods. Any such replacements shall have both their source and origin in countries included in Code B-1 of the A.I.D. Geographic Code Book unless A.I.D. shall otherwise agree in writing and shall be otherwise subject to the provisions of this Agreement.

SECTION 7.05. Utilization of Goods and Services.

(a) Eligible Items shall be used exclusively for the Project, except as A.I.D. may otherwise agree in writing.

(b) Except as A.I.D. may otherwise agree in writing, no Eligible Items shall be used to promote or assist any foreign aid project or activity associated with or financed by any country not included in Code 935 of the A.I.D. Geographic Code Book as in effect at the time of such use.

SECTION 7.06. Reasonable Price. No more than reasonable prices shall be paid for any Eligible Items. Such items shall be procured on a fair and, ^{except for professional services,} /on a competitive basis in accordance with procedures therefor prescribed in Implementation Letters.

SECTION 7.07. Notification to Potential Suppliers. In order that all United States firms shall have the opportunity to participate in furnishing Eligible Items, the Government shall furnish to A.I.D. appropriate information with regard thereto at such time as A.I.D. may request in Implementation Letters.

SECTION 7.08. Information and Marking. The Government will cooperate with A.I.D. in its efforts to disseminate information concerning the Project and shall comply with such reasonable instructions with respect to the marking of Eligible Items as A.I.D. may issue from time to time.

ARTICLE VIII

Disbursements

SECTION 8.01. Disbursement for Foreign Exchange Costs -

Letters of Commitment to United States Banks. Upon satisfaction of conditions precedent, the Government may, from time to time, request A.I.D. to issue Letters of Commitment for specified amounts to one or more United States banks, satisfactory to A.I.D., committing A.I.D. to reimburse such bank or banks for payments made by them to contractors or suppliers, through the use of Letters of Credit or otherwise, for the foreign exchange costs of Eligible Items procured for the Project in accordance with the terms and conditions of this Agreement. Payment by a bank to a contractor or supplier will be made by the bank upon presentation of such supporting documentation as A.I.D. may prescribe in Implementation Letters. Banking charges incurred in connection with Letters of Commitment and Letters of Credit shall be for the account of the Government and may be financed under the Loan. In the case of payments due to United States suppliers of goods and of services related thereto, and such other Eligible Items as A.I.D. may agree, A.I.D. may at its option, issue Letters of Commitment directly to suppliers committing A.I.D. to make payments directly to them of amounts due under contracts between company and such suppliers. Payments to such suppliers will be made upon presentation of such supporting documentation as A.I.D. may prescribe in Implementation Letters.

SECTION 8.02. Reimbursement for Foreign Exchange Costs.

Upon satisfaction of conditions precedent, A.I.D. may promptly

reimburse the Government for the foreign exchange costs of Eligible Items in accordance with the terms and conditions of this Agreement upon receipt of requests for reimbursement submitted from time to time by the Government accompanied by such supporting documentation as A.I.D. may prescribe in Implementation Letters. Banking charges incurred by the Government in connection with Letters of Credit and such other banking charges as A.I.D. and the Government may agree, may be financed under the Loan.

SECTION 8.03. Other Forms of Disbursement. Disbursements of the Loan may also be made through such other means as the Government and A.I.D. may agree in writing.

SECTION 8.04. Date of Disbursement. Disbursements by A.I.D. shall be deemed to occur in the case of disbursements pursuant to Sections 8.01, 8.02 and 8.03 on the date on which A.I.D. makes a disbursement to the Government, to its designee, or to a banking institution pursuant to a Letter of Commitment.

SECTION 8.05. Issuance of Letters of Commitment.

Unless otherwise agreed in writing by A.I.D. the terminal date for issuance of Letters of Commitment is _____ and no Letter of Credit may be established having
an expiration date later
than _____.

SECTION 8.06. Terminal Date for Disbursement. Except as A.I.D. may otherwise agree in writing, no disbursement shall be made under Section 8.03 or against documentation received by A.I.D.

described in Sections 8.01 and 8.02 after _____
A.I.D., at its option, may at any time or times after
reduce the Loan by all or any part thereof for which Letters of
Commitment have not been issued.

ARTICLE IX

Cancellation, Suspension and Acceleration

SECTION 9.01. Cancellation by the Government. The Government may, upon mutual agreement between the parties, by written notice to A.I.D. cancel any part of the Loan (i) which, prior to the giving of such notice, A.I.D. has not disbursed or committed itself to disburse, or (ii) which has not then been utilized through the issuance of irrevocable Letters of Credit or through bank payments made other than under irrevocable Letters of Credit.

SECTION 9.02. Events of Default; Acceleration. If any one or more of the following events ("Events or Default") shall occur:

(a) The Government shall have failed to pay when due any interest or installment of Principal required under this Agreement;

(b) The Government shall have failed to comply with any other provision of this Agreement;

(c) The Government shall have failed to pay when due any interest or any installment of Principal or any other payment required under any other loan agreement, any guaranty agreement, or any other agreement between the Government or any of its agencies and A.I.D. or any of its predecessor agencies;

(d) A default shall have occurred in the performance by the Government of any of its obligations under the Financing Agreement;

(e) A default shall have occurred in the performance by APCC of any of its obligations under the Project Agreement or under the Financing Agreement;

(f) AFCC's Memorandum and Articles of Association, or any provision thereof, shall have been amended/in any manner which in the reasonable opinion of A.I.D. would have a material adverse effect upon the carrying out of the Project or the operation of the Plant in accordance with the Project Agreement;

Without prior consent of
(g) the Government or any other authority having jurisdiction shall have taken any action for the dissolution or disestablishment of AFCC or for the suspension of its operations;

(h) The Government shall, without the prior consent of A.I.D., have transferred, or permitted to be transferred, shares of AFCC, or the rights appertaining thereto, to any person (except a director of AFCC holding such shares as a nominee of the Government), association or other entity;

(i) A loan from any of the Other Lenders shall have become eligible, at the option of any of the Other Lenders, for suspension or termination prior to its agreed maturity date or a default shall have occurred in the performance of any obligation of the Government pursuant to any of the other Loan Agreements or in the performance of any obligation of AFCC pursuant to any other agreement concerning the Project with any of the Other Lenders;

(j) AFCC shall have become unable to pay its debts as they mature, or any action or proceeding shall be taken by AFCC or others whereby any of its property or assets shall or may be distributed among, or administered for the benefit of its creditors;

(k) Any situation shall have arisen which interferes, or threatens to interfere, with the supply of gas required for the Plant in accordance with the terms of the Gas Purchase Agreement; or

(1) AFCC shall have created, acquired or taken over a subsidiary or any other entity, if such creation, acquisition or taking over would, in the reasonable opinion of A.I.D., adversely affect the conduct of AFCC's business, AFCC's financial condition, the efficiency of AFCC's management and personnel, the carrying out of the Project or the operation of the Plant;

then A.I.D. in addition to the remedies provided hereunder may, at its option, give the Government notice of the existence of the default, and, unless the Event of Default is cured with sixty (60) days:

(i) such unrepaid Principal and any accrued interest hereunder shall be due and payable immediately; and

(ii) the amount of any further disbursements made under then outstanding irrevocable Letters of Credit or otherwise shall become due and payable as soon as made.

SECTION 9.03 Suspension of Disbursements. In the event that at any time:

(a) An Event of Default has occurred;

(b) An event occurs that A.I.D. determines to be an extraordinary situation that makes it improbable either that the purpose of the Loan will be attained or that the Government will be able to perform its obligations under this Agreement;

(c) Any disbursement would be in violation of the Legislation governing A.I.D.; or

(d) The Government shall have failed to pay when due any interest or any installment of Principal or any other payment required

under any other loan agreement, any guaranty agreement or any other agreement with the Government of the United States or any of its agencies,

then A.I.D. in addition to the remedies provided elsewhere herein may at its option:

(i) Suspend or cancel outstanding commitment documents to the extent that they have not been utilized through the issuance of irrevocable Letters of Credit or through bank payments made other than under irrevocable Letters of Credit; in which event A.I.D. shall give notice to the Government promptly thereafter;

(ii) Decline to make disbursements other than under outstanding commitment documents;

(iii) Decline to issue additional commitment documents; and

(iv) At A.I.D.'s expense, direct that title to goods financed under the Loan shall be transferred to A.I.D. if the goods are from a source outside the country of the Government, are in a deliverable state and have not been offloaded in ports of entry of the country of the Government. Any disbursement made under the Loan with respect to such transferred goods shall be deducted from Principal.

SECTION 9.04. Cancellation by A.I.D. Following any suspension of disbursements pursuant to Section 9.03 if the cause or causes for such suspension of disbursements shall not have been eliminated or corrected within sixty (60) days from the date of such suspension, A.I.D. may, at its option, at any time or times

thereafter, cancel all or any part of the Loan that is not then either disbursed or subject to irrevocable Letters of Credit.

SECTION 9.05. Continued Effectiveness of Agreement.

Unless A.I.D. may otherwise agree in writing, notwithstanding any cancellation (by A.I.D. or the Government), suspension of disbursement or acceleration of repayment, the provisions of this Agreement shall continue in full force and effect until the payment in full of all Principal and any accrued interest hereunder.

SECTION 9.06. Refunds.

(a) In the case of any disbursements not supported by valid documentation in accordance with the terms of this Agreement, or of any disbursement not made or used in accordance with the terms of this Agreement, A.I.D., notwithstanding the availability or exercise of any of the other remedies provided for under this Agreement may require the Government to refund such amount in United States Dollars

to A.I.D. within ninety (90) days after receipt of a request there-

At the option of A.I.D. such amount may be made available for financing with for ^{for} be applied to the installments of Principal respect to the project or ms

in the inverse order of their maturity. Notwithstanding any other provision in this Agreement, A.I.D.'s rights to require a refund with respect to any disbursement under the Loan shall continue for five years following the date of such disbursement.

(b) In the event that A.I.D. receives a refund from any contractor, supplier, or banking institution, or from any other third party connected with the Loan, with respect to goods or

services financed under the Loan, and such refund related to an unreasonable price for goods or services, or to goods that did not conform with specifications, or to services that were inadequate, A.I.D. shall permit Government to reuse such refunds if the terminal date for disbursements under Section 8.06 has not passed and there is sufficient time for the Government to utilize the funds before such terminal date. In the event that the terminal date for disbursement has passed or there is not sufficient time to utilize the funds before the terminal date, the refund shall be applied to the instalments of Principal in the inverse order of their maturity.

SECTION 9.07. Expenses of Collection. All reasonable costs incurred by A.I.D. other than salaries of its staff, in connection with the collection of any refund or in connection with amounts due A.I.D. by reason of the occurrence of any of the events specified in Section 9.02 may be charged to the Government and reimbursed to A.I.D. in such manner as A.I.D. may specify.

SECTION 9.08. Non-Waiver of Remedies. No delay in exercising or omission to exercise any right, power, or remedy accruing to A.I.D. under this Agreement shall be construed as a waiver of any such rights, powers or remedies.

ARTICLE X

Miscellaneous

SECTION 10.01. Taxation. This Agreement, and the Loan shall be free from, and the Principal and interest shall be paid without deduction for and be free from, any taxation or fees imposed under the laws in effect within the country of the Government. To the extent that any commodity procurement transaction financed hereunder is not exempt from identifiable taxes, tariffs, duties and other levies imposed under laws in effect within Bangladesh, the same shall not be paid with funds provided under the Loan.

SECTION 10.02. Communications. Any notice, request or communication given, made or sent by the Government or A.I.D. pursuant to the Agreement shall be in writing and shall be deemed to have been duly given, made or sent to the party to which it is addressed when it shall be delivered by hand or by mail, telegram, cable, or radiogram to such other party at the following address:

TO THE GOVERNMENT:

Mail Address: Secretary
Ministry of Planning
Bangladesh Secretariat
Dacca, Bangladesh

Cable Address: PLANCOM

A.I.D.:

Mail Address: USAID Bangladesh Office
American Embassy
Adamjee Court
P. O. Box 323, Ramna
Dacca-2, Bangladesh

Cable Address: USAID

Other addresses may be substituted for the above upon giving a notice as provided herein. All notices, requests, communications and documents submitted to A.I.D. hereunder shall be in English, except as A.I.D. may otherwise agree in writing.

SECTION 10.03. Representatives. For all purposes relative to this Agreement, the Government will be represented by the individual holding or acting in the office of the Secretary, Ministry of Planning, and A.I.D. will be represented by the individual holding or acting in the Office of Coordinator, USAID Bangladesh Office. Such individuals shall have the authority to designate by written notice additional representatives. In the event of any replacement or other designation of a representative hereunder, the Government shall submit a statement of the representative's name and specimen signature in form and substance satisfactory to A.I.D. Until receipt by A.I.D. of written notice of revocation of the authority of any of the duly authorized representatives of the Government designated pursuant to this Section, it may accept the signature of any such representative or representatives as conclusive evidence that any action effected by such instrument is duly authorized.

SECTION 10.04. Implementation Letters. A.I.D. may from time to time issue Implementation Letters that will prescribe the procedures applicable hereunder in connection with the implementation of the provisions of this Agreement.

SECTION 10.05. Termination Upon Full Payment. Upon payment in full of the Principal and of any accrued interest, this Agreement and all obligations of the Government and A.I.D. under this Loan Agreement shall terminate.

SECTION 10.06. Promissory Notes. At such time or times as A.I.D. may request, the Government shall issue promissory notes or such other evidences of indebtedness with respect to the Loan, in such form, containing such terms and supported by such legal opinions as A.I.D. may reasonably require, provided, the terms of such promissory notes or other evidences of indebtedness shall not vary from the terms and conditions contained in this Loan Agreement.

IN WITNESS WHEREOF, the GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH and the AGENCY FOR INTERNATIONAL DEVELOPMENT, each acting through its respective duly authorized representative, have caused this Agreement to be signed in their name and delivered as of the date and year first above written.

PRESIDENT
FOR THE / ' OF THE PEOPLE'S REPUBLIC
OF BANGLADESH

THE UNITED
STATES OF AMERICA

BY _____

BY _____

Title:

Title:

ANNEX I

Description of the Project

The Project consists of the design, construction, commissioning and initial operation of a new ammonia/urea fertilizer plant (the Plant) at Ashuganj on the eastern bank of the Meghna River in the Comilla District of Bangladesh, and includes the following:

1. Preparation of the site for the Plant.
2. Designing, procurement of equipment (and chemicals and catalysts for initial operation) for, and constructing;
 - (a) an intermediate ammonia unit with a designed production capacity of approximately 925 metric tons per day;
 - (b) a urea unit with a designed production capacity of 1,600 metric tons of prilled urea per day; and
 - (c) utilities, offsites and supporting facilities for the ammonia and urea units.
3. Construction of a staff housing colony, including common facilities, for personnel to be employed in the management and operation of the Plant.
4. Provision of construction equipment.
5. Engagement of a Technical Advisor to assist and advise AFCC in construction and commissioning of the Plant.
6. Engagement of a Management Advisor to provide experts to assist and advise AFCC during the construction, commissioning and initial operation of the Plant.
7. Training of AFCC personnel to manage and operate the Plant.

The Project shall be deemed to have been completed as of the date that both of the following events have occurred: (i) the general contractor referred to in the Project Agreement shall have certified to AFCC and to the Bank that the Plant has met the performance tests specified in the contract between the general contractor and AFCC, and (ii) the Plant has produced urea at the rate of eighty per cent of its rated urea capacity (in the aggregate for a ninety day period) for a period of ninety consecutive days. The Project is expected to be completed by 31 December 19

Financing for the Project is being provided by several countries or institutions including the Government of Bangladesh. Total funds made available have in some cases been allocated to specific items required for the Project. In the case of A.I.D., Eligible Items shall be, subject to modification by A.I.D. in writing, within the following description:

1. Ammonia Storage Refrig. and Bottling.
2. Cond. Stripp, Water Treat. C Tower
3. Sewer and Effluent Treatment
4. Construction Equip.
5. Boats and Vehicles
6. Bagging
7. Bag Lining Machine
8. Vinnell Site Preparation Contract.

ANNEX 25

SECTION 611(e) CERTIFICATION

The Acting USAID Director has certified as to this Project's compliance with Section 611(e) of the Foreign Assistance Act. This certification is presently enroute to Washington and will be on file in NESA/CD.

A.I.D. Loan No.

CAPITAL ASSISTANCE LOAN AUTHORIZATION

Provided from: Development Loan Funds
(Bangladesh - Ashuganj Fertilizer Plant)

Pursuant to the authority vested in me as Administrator of the Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, ("the Act") and delegations of authority issued thereunder, I hereby authorize a Loan to the Peoples' Republic of Bangladesh ("Borrower") in an amount of Thirty Million United States Dollars (\$30,000,000) pursuant to Part I, Chapter I, Section 103 - Food and Nutrition and Part I, Chapter II, Title I (Development Loan Fund) of the Act, to assist in financing the foreign exchange costs of goods and services required for site preparation for and construction of a urea fertilizer plant at Ashuganj in Bangladesh ("Project").

This Loan shall be subject to the following conditions:

1. Interest Rate and Terms of Repayment

The Loan shall be repaid by the Borrower within forty (40) years after the date of the first disbursement under the Loan, including a grace period of not to exceed ten (10) years from such date. Interest on the outstanding balance of the disbursements under the Loan and on any due and unpaid interest shall be at the rate of two percent (2%) per annum during the grace period and at the rate of three percent (3%) per annum thereafter.

2. Currency of Repayment

Repayment of funds due under the Loan and payment of interest thereon shall be in United States Dollars.

3. Other Terms and Conditions

a. Borrower shall assure A.I.D. that any other currencies required for the project will be made available in a timely fashion.

b. Borrower shall make arrangements satisfactory to A.I.D. with other responsible lenders for financing in sufficient amounts to meet the costs of the Project.

c. Unless A.I.D. otherwise approves in writing, procurement of goods and services financed under the Loan shall be from the United States or other Code 941 countries.

d. The Loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Date: _____

Administrator

DRAFT
PHeininger
November 6, 1974

FINANCING AGREEMENT

(Ashuganj Fertilizer Project)

between

PEOPLE'S REPUBLIC OF BANGLADESH

and

ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED

_____, 1974

FINANCING AGREEMENT

AGREEMENT, dated _____, 1974, between People's Republic of Bangladesh (the "Government") and Ashuganj Fertilizer and Chemical Company Limited (the "Company").

WHEREAS (A) The Government of the Federal Republic of Germany has enabled the Government of Bangladesh to obtain from the Kreditanstalt für Wiederaufbau, a loan (the "KfW Loan") in an amount of DM30,000,000 on the terms and conditions set forth in an agreement, dated _____, entered into between KfW, the Government and the Company;

(B) The Government intends to contract from the Government of Switzerland a loan (the "Swiss Loan") in an amount of SwF20,000,000 on the terms and conditions set forth in an agreement to be entered into between the Swiss Government and the Government;

(C) The Government has contracted with the United Kingdom of Great Britain and Northern Ireland, acting through its Ministry for Overseas Development, a loan and grant (the "ODM Loan/Grant") in an amount of £8,000,000 on the terms and conditions set forth in an agreement, dated _____, entered into between the Government of the United Kingdom and the Government;

(D) The Government has contracted from the United States of America, acting through the Agency for International Development, a loan (the "AID Loan") in the amount of \$30,000,000 on the terms and conditions set forth in an agreement, dated _____, entered into between AID and the Government;

(E) The Government has contracted with the Asian Development Bank a loan (the "ADB Loan") in various currencies equivalent to \$30,000,000 on the terms and conditions set forth or referred to in an agreement, dated _____, entered into between the Government and ADB;

(F) The Government has contracted with the International Development Association a development credit (the "IDA Credit") in various currencies equivalent to \$33,000,000 on the terms and conditions set forth or referred to in an agreement, dated _____, entered into between the Government and IDA;

(G) Under the terms of the agreements described above (hereinafter referred to collectively as the "External Finance Agreements"), the Government has agreed to transfer the proceeds of the loans, grant and credits described above (hereinafter referred to collectively as the "External Credits") to the Company to assist the Company in carrying out the project described in the External Finance Agreements (the "Project");

(H) Under the terms of the External Finance Agreements, the Government has agreed to provide the Company with the local currency and foreign exchange funds required, in addition to the foreign exchange provided through the External Credits, to carry out the Project; and

(I) The Government has, at the date of this Agreement, purchased for cash at their nominal value, (no.) shares of the Company, having a nominal value of Tk100 each, and such shares have been issued and are fully paid up;

THEREFORE it is agreed between the parties hereto as follows;

ARTICLE I

Definitions

Section 1.01. Whenever used in this Agreement, unless the context shall otherwise require, the terms defined in the Preamble to this Agreement have the meanings therein set forth and the following additional terms have the following meanings:

(a) "Commercial Operation Date" means the date of the first day as of which the fertilizer plant to be built by the Company has produced eighty per cent of its rated urea capacity (in the aggregate for a sixty day period without allowance for shutdown for maintenance) for a period of sixty consecutive days;

(b) "Currency of Bangladesh" means such coin or currency as at the time referred to is legal tender for the payment of public and private debts in the Government's territory;

(c) "External Lenders" means the governments, agencies thereof or institutions referred to in the Preamble to this Agreement which extend External Credits;

(d) "Repayment Schedule" means the schedule referred to in Section 3.03 of this Agreement, as amended from time to time;

(e) "Shares" means ordinary shares of the Company having a nominal value of Tk100 each; and

(f) "Subsidiary Loan" means the loan provided for in Article III of this Agreement.

Article II

Subscription to Company's Shares

Section 2.01. The Company agrees to sell the Government (no.) [total of shares required to be sold during period covered by schedule less aggregate nominal value of shares inserted in Recital (I)] Shares, and the Government agrees to make payment for such Shares at the price of Tk100 each, in the amounts and at the dates set forth in the Schedule to this Agreement.

Section 2.02. The amounts set forth in the Schedule to this Agreement represent the best estimates of the parties hereto of the equity capital needs of the Company for the period covered in such Schedule. To provide for the contingency that the Company may need additional equity capital during and after such period, the following is agreed: (a) The Company, not later than thirty days prior to the end of each calendar quarter, will prepare estimates of its unencumbered cash resources and expenditures for the next calendar quarter, indicating the amount thereof expected to be financed by direct payments to suppliers of goods and services through the External Credits. (b) To the extent such estimates for the ensuing quarter show that the Company's cash resources will be less than its expenditures other than those expected to be so financed through the External Credits, the Company will promptly inform the Government of this situation and will offer to sell the Government a sufficient number of its Shares, at Tk100 each, to obtain the funds required to cover this shortfall. (c) The Government will, within fifteen

days of receipt of such offer, make payment for the Shares so offered at Tk100 each, without limitation to its obligations under Section 2.01 of this Agreement.

Section 2.03. (a) On and after the Commercial Operation Date, the Government and the Company will insure that the Company's unimpaired paid-up share capital is not less than forty per cent of the Company's total capital, which for the purposes of this Section shall mean the total of such unimpaired paid-up share capital plus the aggregate outstanding principal amount of debt of the Company maturing by its terms one year or more after the Commercial Operation Date ("long term debt").

(b) In implementation of the foregoing paragraph (a), the Company will promptly: (i) inform the Government if its unimpaired paid-up share capital falls below such forty per cent level, (ii) certify the amount of additional share capital required to meet such level, and (iii) offer the Government a sufficient number of its Shares, at TK100 each, to obtain such amount of additional share capital. The Government will, within fifteen days of receipt of such offer, make payment for the Shares so offered at Tk100 each, without limitation to its obligations under Section 2.01 of this Agreement.

Section 2.04. The purchase price for Shares sold and purchased hereunder shall be paid in full to the Company in cash on the date specified for payment herein, provided that Shares purchased to satisfy the requirements of the preceding Section 2.3 may, at the Government's option, be paid for by way of cancellation of long term debt of the Company to the Government and accrued interest allocable thereto in an

aggregate amount equal to the aggregate nominal amount of Share purchased; provided further that no portion of the Subsidiary Loan may be cancelled for such purpose except that allocable to the IDA Credit.

ARTICLE III

Subsidiary Loan

Section 3.01 (a) The Government hereby agrees to lend to the Company, on the terms and conditions set forth in this Agreement such amounts in the currency of Bangladesh as are equivalent to the aggregate amount of the External Credits withdrawn by, or on behalf of, the Government from the accounts established by the External Lenders in respect of the External Credits. To facilitate such withdrawals, the Managing Director of the Company is hereby authorized to: (i) make withdrawals from such credit accounts and to take all such action on behalf of the Government which is incidental or ancillary thereto including, without limitation, requests for commitments to pay amounts to the Government or others in respect of expenditures to be financed under the External Credits, and (ii) to empower other officers of the Company to make such withdrawals and to take such actions.

(b) The Government shall open a Loan Account on its books in the name of the Company. Withdrawals of the Subsidiary Loan shall be deemed to be made by the Company from the Loan Account on the dates on which withdrawals are made from the accounts established by the External Lenders in respect of the External Credits. The Loan Account shall reflect the various currencies in which payments have been made and, if applicable, the currencies which have been used by the External Lenders to purchase such currencies. In any cases in which withdrawals from the accounts established by the External Lenders in respect of the External Credits

are made to reimburse the Company for amounts it has advanced for purposes of the Project, the Government shall transfer cash to the Company promptly on receipt of funds from the External Lenders in respect of such advances, converted at the prevailing rate of exchange as reasonably determined by the Government.

Section 3.02. The principal amount of the Subsidiary Loan outstanding at any time shall be the aggregate equivalent in the currency of Bangladesh, as reasonably determined by the Government, of:

(a) in the case of the KfW Loan, the Swiss Loan, the ODM Loan/Grant and the AID Loan, the amounts withdrawn from the accounts established in respect of such External Credits and provided to, or on the order of, the Company (including amounts so withdrawn to purchase other currencies) in deutschemark, Swiss francs, pounds sterling or U.S. dollars, respectively; and

(b) in the case of the ADB Loan and the IDA Credit, the amounts in various currencies provided to or on the order of the Company (notwithstanding that ADB or IDA may have used a currency other than that so provided to purchase the currency provided),

less the aggregate amounts of principal of the Subsidiary Loan repaid to the Government.

Section 3.03. (a) The Company shall repay outstanding principal amounts of the Subsidiary Loan in the currency of Bangladesh, commencing December 1, 1979, in accordance with a Repayment Schedule to be agreed

to by the parties hereto not later than September 1, 1979. The Repayment Schedule shall be revised annually, by agreement between the parties hereto, not later than July 1 of each subsequent year (until the principal amount of the Subsidiary Loan has been repaid) if, and to the extent, required to reflect changes in the aggregate principal amount outstanding as determined pursuant to Section 3.02 of this Agreement. The Repayment Schedule shall provide initially for twenty equal semi-annual installments of principal on December 1 and June 1 of each year and, to the extent its amendment is required, the principle of equal semi-annual installments in respect of installments due after the date of each amendment will be followed without extending the final maturity date. Any such amendments shall become effective on December 1 of the year in which they are made. The Repayment Schedule shall specify the currencies, the equivalent of which determine the Company's obligation in the currency of Bangladesh, and their equivalent in the currency of Bangladesh as of the effective date of the Repayment Schedule.

(b) Not less than thirty days before any payment of principal is due, the Government shall notify the Company of the foreign currency or currencies listed in the Repayment Schedule to which the next payment of principal are to be applied. Each principal payment shall be applied to reduce, in the Loan Account, the amounts of the foreign currencies so specified according to exchange rates prevailing on the date of such payment in the case of the payment due on December 1, or on the previous December 1 in the case of the payment on June 1.

(c) The Company shall have the right to prepay in advance of maturity all, or any portion of, the outstanding principal of the Subsidiary Loan without penalty or premium. Any such prepayment shall be applied to installments due in the reverse order of their maturity, and shall be applied to reduce such foreign currencies shown in the Loan Account as the Government shall elect, valued in accordance with the principles specified in the preceding paragraph (b).

Section 3.04. (a) The Company shall pay interest in the currency of Bangladesh on the principal amount of the Subsidiary Loan outstanding from time to time at a rate of ten per cent per annum.

(b) Interest shall accrue from the respective dates on which amounts shall be withdrawn from the Loan Account and shall be computed on the basis of a 360-day year of twelve 30-day months.

(c) Interest shall be payable semi-annually on December 1 and June 1 of each year.

(d) For purposes of computing interest, the principal amount of the Subsidiary Loan outstanding shall be taken to be:

(i) Prior to December 1, 1979 the equivalents, in the currency of Bangladesh, of the currencies referred to in Section 3.02 of this Agreement determined as of the date of such currencies' withdrawal (or when applicable in the case of the IDA Credit, the date of withdrawal of the currency used to purchase such currencies) from the accounts established by the External Lenders in respect of the External Credits;
and

(ii) After December 1, 1979 the aggregate principal amount of the Subsidiary Loan outstanding from time to time as determined for purposes of the Repayment Schedule.

ARTICLE IV

Other Obligations of the Company

Section 4.01. The Company shall comply with all obligations it has undertaken, or will undertake, to the External Lenders in respect of the External Credits, pursuant to project agreements, loan and project agreements or otherwise.

Section 4.02. The Company undertakes that, except as the Government shall otherwise agree: (a) if the Company shall create any lien on any of its assets as security for any debt, such lien will equally and ratably secure the payment of the principal of, and interest on, the Subsidiary, and in the creation of any such lien express provision will be made to that effect, or (b) if the Company shall transfer any of its assets fiduciae causa as security for debt, the Company shall make to the Government an equivalent property transfer satisfactory to the Government; provided that the foregoing provisions of this Section shall not apply to:

(i) any lien created on, or any fiduciary transfer of, property, at the time of purchase thereof, solely as security for the payment of the purchase price of such property; or

(ii) any lien or fiduciary transfer of property arising in the ordinary course of banking transactions and securing a debt not maturing more than one year after its date.

For the purposes of this Section, the term "lien" shall include mortgages, pledges and charges of any kind.

ARTICLE V

Other Obligations of the Government

Section 5.01 (a) The Government will, in addition to complying with Article II of this Agreement and to lending the Company the proceeds of the External Credits, provide the Company promptly as required with such other funds, including foreign exchange, as shall be required to enable the Company to complete the Project.

(b) Subject to the requirements of the External Finance Agreements, such funds may, at the Government's option, be provided by way of loan or in exchange for the Company's shares.

(c) To the extent such funds are provided by way of loans by the Government (whether directly or through one of its agencies, instrumentalities or statutory corporations), such loans shall be made on substantially the same terms as those applicable to the Subsidiary Loan.

ARTICLE VI

Acceleration of Maturity

Section 6.01. If any of the External Lenders shall have declared the principal of any of the External Credits then outstanding to be due and payable immediately, then at any time during the continuance thereof, the Government, at its option, may by notice to the Company declare the principal of the Subsidiary Loan to be due and payable immediately together with the interest thereon, to the extent the principal of and interest on the Subsidiary Loan are allocable to such External Credits as to which such action has been taken; and upon any such declaration, the principal of the Subsidiary Loan, together with the interest and other charges thereon, to such extent shall become due and payable immediately, anything in this Agreement to the contrary notwithstanding.

Section 6.02. If (i) the Company should default in the payment of principal of, or interest on, the Subsidiary Loan, and such default shall continue for thirty days or (ii) the Company shall fail to perform any other obligation hereunder and such failure shall continue for a period of sixty days, then at any time during the continuance of such default or failure, the Government may, at its option, by notice to the Company, declare the principal of the Subsidiary Loan then outstanding to be due and payable immediately, together with the interest thereon, and upon any such declaration, such principal and interest shall become due and payable immediately.

ARTICLE VII

Miscellaneous

Section 7.01. The Company shall promptly inform the Government of any action taken or applications, statements, representations or documents made or furnished by the Company to the External Lenders and shall provide the Government with copies of all such applications, statements, representations or documents.

Section 7.02. This Agreement shall become effective on the date on which the Government first becomes entitled to withdraw the proceeds of any External Credit.

Section 7.03. The provisions of this Agreement shall continue in force and effect notwithstanding any cancellation or suspension of the rights of the Government under any of the External Finance Agreements.

Section 7.04. (a) Any notice or request required or permitted to be given or made under this Agreement shall be in writing and shall be deemed to have been duly given or made when it shall have been delivered, until further notice, to the Nationalised Industries Division of the Ministry of Industries, in the case of the Government, or to the principal office of the Company in Dacca, in the case of the Company.

(b) Any action required or permitted or any documents required or permitted to be executed under this Agreement on behalf of the Company shall be taken or executed by its Managing Director or such other person or persons as the Managing Director shall designate in writing.

IN WITNESS WHEREOF the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and to be delivered in Dacca, as of the day and year first above written.

PEOPLES' REPUBLIC OF
BANGLADESH

ASHUGANJ FERTILIZER AND CHEMICAL
COMPANY LIMITED

on behalf of the President

Managing Director

SCHEDULE

Shares Agreed to be Purchased by the
Government from the Company

<u>Purchase Date</u>	<u>No. of Shares</u>	<u>Purchase Price</u>
Fifteen days after the date on which this Agreement becomes effective *	405,000 less the number of shares stated in Recital (I) to this Agreement	Tk40,500,000 less the amount paid for the Shares referred to in such Recital
April 1, 1975	158,000	15,800,000
July 1, 1975	158,000	15,800,000
October 1, 1975	165,000	16,500,000
January 1, 1976	450,000	45,000,000
April 1, 1976	480,000	48,000,000
July 1, 1976	630,000	63,000,000
October 1, 1976	660,000	66,000,000
January 1, 1977	787,000	78,700,000
April 1, 1977	750,000	75,000,000
July 1, 1977	690,000	69,000,000
October 1, 1977	682,000	68,200,000
January 1, 1978	675,000	67,500,000
April 1, 1978	675,000	67,500,000
July 1, 1978	<u>668,000</u>	<u>66,800,000</u>
Totals	8,033,000	803,300,000

* If this Agreement should not become effective on or before March 17, 1975, the 405,000 shares to be purchased fifteen days after effectiveness, together with any shares which were to have been purchased on or before fifteen days after the actual effective date, shall be purchased fifteen days after the actual effective date.

PROJECT AGREEMENT

PROJECT AGREEMENT, dated _____, 1974, between ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED ("AFCC"), a private corporation owned by the Government of Bangladesh and organized under the law of Bangladesh (specifically the Companies Act of 1913), and the UNITED STATES OF AMERICA, acting through and by the Agency for International Development ("A.I.D.").

IN CONSIDERATION of A.I.D. having established a Loan in the amount of \$30 million United States Dollars to the Government of Bangladesh ("Government") upon terms and conditions contained in a Loan Agreement of even date herewith, including a condition that the proceeds thereof be made available to AFCC, through an approved Financing Agreement, for the Project hereinafter defined, AFCC hereby agrees and obligates itself to A.I.D. as follows:

ARTICLE I

Definitions

Section 1.01. Definitions. Wherever used in this Agreement, unless the context otherwise requires, the various definitions contained in the Loan Agreement referred to in the paragraph next preceding this Section shall be applicable to this Agreement.

ARTICLE II

Particular Covenants

Section 2.01. Prosecution of the Project. AFCC shall carry out the Project and manage and operate the Plant with due diligence and efficiency, and in conformity with sound administrative, financial, engineering, industrial and marketing practices applicable from time to time to the fertilizer industry.

Section 2.02. Prompt Use of Resources. AFCC shall make available and utilize, promptly as needed, the funds, facilities, services, lands and other resources which are required, in addition to the proceeds of the Loan and funds made available by the Other Lenders, for the carrying out of the Project and the operation of the Plant.

Section 2.03. Consultants, Plans and Specifications.

(a) In carrying out the Project, AFCC shall employ competent and experienced consultants (including a technical advisor and a management advisor) and contractors (including a general contractor) acceptable to A.I.D. to an extent and upon terms and conditions acceptable to A.I.D.

(b) AFCC shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to A.I.D. AFCC shall promptly furnish or cause to be furnished to A.I.D. such plans, design standards, specifications and work schedules, and any material modifications made therein, in such detail as A.I.D. shall reasonably request.

Section 2.04. Insurance. (a) AFCC shall obtain and maintain with responsible insurers, or make other arrangements satisfactory to A.I.D. for, insurance against such risks and in such amounts as shall be consistent with sound practice in the fertilizer industry.

(b) Without limiting the generality of the foregoing, AFCC undertakes to insure or cause to be insured the goods to be imported for the Project and to be financed out of the proceeds of the Loan against marine, transit and other hazards incident to the acquisition, transportation and delivery thereof to the place of use or installation. Claims under such insurance shall be payable in the currency in which such goods were financed or in any freely convertible currency. Any indemnification received shall be used to replace or repair the lost or damaged goods or shall reimburse for replacement or repair.

Section 2.05. Books and Records. AFCC shall maintain or cause to be maintained books and records showing all costs of goods financed under the Project and adequate to identify the goods financed out of the proceeds of the Loan, to disclose the use of all goods in the Project, to record the progress of the Project (including the cost thereof).

Section 2.06. Reporting and Consultation. A.I.D. and AFCC shall cooperate fully to ensure that the purposes of the Loan will be accomplished. To that end:

(a) AFCC shall furnish to A.I.D. all such information as A.I.D. shall reasonably request concerning the expenditure of the proceeds of the Loan, the goods financed out of such proceeds, the Project, the management and operation of the Plant, the administration, operations and financial condition of AFCC, and other matters relating to the purposes of the Loan.

(b) AFCC shall promptly inform A.I.D. of any condition which interferes or threatens to interfere with the progress of the Project, the accomplishment of the purposes of the Loan or the performance by AFCC of its obligations under this Agreement or the Financing Agreement.

(c) A.I.D. and AFCC shall from time to time, at the request of either party, exchange views through their representatives with regard to the performance by AFCC of its obligations under this Agreement or the Financing Agreement, the administration, operations and financial condition of AFCC, and other matters relating to the purposes of the Loan.

Section 2.07. Inspections. AFCC shall enable representatives of A.I.D. to inspect the Project, the goods financed out of the proceeds of the Loan, the Plant and all other plants, sites, works, properties and equipment of AFCC, and any records and documents relevant thereto.

Section 2.08. Amendment of Articles or By-Laws. AFCC shall promptly notify A.I.D. of any proposal to amend, suspend

or abrogate any provision of its Memorandum of Articles of Association or By-Laws and shall not take any action on such proposal without the prior written approval of A.I.D.

Section 2.09. Application of Loan Funds. Except as A.I.D. may otherwise agree, AFCC shall apply the proceeds of the Loan to the financing of expenditures on the Project in accordance with the provisions of the Loan Agreement and this Agreement, and shall ensure that all goods financed out of such proceeds are used exclusively in the carrying out of the Project.

Section 2.10. Compliance With Other Agreements. Except as A.I.D. may otherwise agree, AFCC shall duly perform all its obligations under the Financing Agreement, the Gas Supply Agreement and any agreements with, or in respect of, loans made by the Other Lenders in connection with the Project, and shall not take, or concur in, any action which would have the effect of assigning, amending, abrogating or waiving any rights or obligations of the parties thereunder.

Section 2.11. Business Practices. (a) AFCC shall, promptly as required, take all action within its powers to maintain its corporate existence and right to carry on its operations and to acquire, maintain and renew all rights, properties, powers, privileges and franchises which are necessary or useful in the carrying out of the Project and the operation of the Plant or in the conduct of its business.

(b) AFCC shall at all times conduct its business and carry on its operations in accordance with sound administrative, financial and industrial practices and under the supervision of competent and experienced management and personnel.

(c) AFCC shall at all times operate and maintain the Plant and from time to time, promptly as needed, make all necessary repairs and renewals thereof, all in accordance with sound administrative, financial, engineering and industrial practices applicable from time to time to the fertilizer industry.

Section 2.12. Disposition of Assets. Except as A.I.D. may otherwise agree, AFCC shall not ~~may~~ sell, lease, transfer or hypothecate or otherwise dispose of any of its property or assets which shall be required for the efficient carrying on of its operations or the disposal of which may prejudice its ability satisfactorily to perform any of its obligations under this Agreement or the Financing Agreement.

Section 2.13. Environmental Protection. AFCC shall ensure that environmental and pollution controls designed to meet environmental protection standards satisfactory to A.I.D. are installed in the Plant as a part of the Project and that such controls are thereafter maintained in good condition and properly utilized.

Section 2.14. Electrical Power. If an electrical power generating facility of sufficient capacity to supply the entire

needs of the Plant is not included within the Plant, AFCC shall, not later than 31 December 1975 enter into a contract, on terms and conditions satisfactory to A.I.D., with the Bangladesh Power Development Board for the long-term supply of electrical power necessary for the Plant.

Section 2.15. Top Management Appointments. Prior to making any appointment to the positions of Plant Manager and Chief Financial Officer, AFCC shall inform A.I.D. of its proposal to make such appointment, furnishing such information as to the qualifications and experience of the proposed appointee as it shall reasonably request, and shall afford A.I.D. sufficient opportunity to consult with AFCC prior to making such appointment.

ARTICLE III

Financial Covenants

Section 3.01. Definitions. As used in this section:

(a) "Generally accepted accounting principles" shall mean those principles which have substantial authoritative support and are applicable in the circumstances as of the date of the report.

(b) "Consistentbasis" shall mean, in reference to the application of generally accepted accounting principles, that the accounting principles observed in the current period are comparable in all material respects to those applied in the preceding period.

(c) "Current assets" shall mean the sum of unrestricted cash available for use in current operations, marketable securities (excluding securities, whether marketable or not, made for purposes of control, affiliation, or other continuing business advantage), receivables collectible in the normal course of business within one year, and inventories (excluding spare parts) valued at the lower of cost or market.

(d) "Current liabilities" shall mean all obligations of AFCC due on demand or within one year or whose liquidation is reasonably expected to require the use of existing sources classified as current assets. Obligations shall include but not be limited to accrued taxes on or measured by income and current maturities of long-term debt.

(e) "Long-term debt" shall mean any and all loan contracts and agreements, bonds, debentures, notes or other debt, whether secured or unsecured, which shall be payable after twelve (12) months from the balance sheet date at which the determination is made, as shown by AFCC's financial statements, all determined and prepared in accordance with generally accepted accounting principles. Debt shall be deemed to be incurred (A) under a loan contract or agreement, on the date and to the extent that it is drawn down pursuant to such loan contract or agreement, and (B) under a guarantee agreement, on the date the agreement providing for such guarantee is entered into but only to the extent that the guaranteed debt is outstanding. Whenever it

(i) "Net revenues" shall mean the gross revenues from all sources less operating and administrative expenses, including taxes, surcharges and other levies, if any, but before provision for depreciation and interest and other charges on long-term debt.

(j) "Debt service requirements" shall mean the aggregate amount of amortization, interest and other charges in respect of long-term debt.

Section 3.02. Accounting Records and Inspection. AFCC shall maintain books and records of account in accordance with generally accepted accounting principles adequate to reflect in operations and financial condition and permit the authorized representatives of A.I.D. at all reasonable times to inspect the books and records and any other documents, correspondence and memoranda.

Section 3.03. Consultations With Auditors. AFCC hereby authorizes and grants to A.I.D., upon A.I.D.'s request, the opportunity of discussing AFCC's financial statements and its financial affairs at any time and from time to time with AFCC's independent accountants, and shall further authorize and require any representative of such auditors to participate in any such discussions, provided, however, that any such discussion shall be conducted only in the presence of an officer of AFCC except as AFCC shall otherwise consent.

Section 3.04. Quarterly Financial Reporting. AFCC shall deliver to A.I.D. within 45 days after the close of each of the first three quarters of each fiscal year of AFCC:

(a) An unaudited balance sheet of AFCC as of the close of each quarter and statements of profit and loss for that portion of the fiscal year-to-date then ended, prepared in conformity with generally accepted accounting principles, applied on a basis consistent with that of the preceding period or containing disclosure of the effect on the financial position or results of operations of any change in the application of generally accepted accounting principles during the period, and reported on by an authorized financial officer of AFCC;

(b) A written statement by an authorized financial officer of AFCC at the end of each quarterly period that there existed no condition or event which constitutes a default in the observance, performance, and fulfillment of any of the covenants, agreements, or conditions contained in this Agreement, or which, after notice by A.I.D. or lapse of time, or both, would constitute such default.

Section 3.05. Annual Financial Reporting. AFCC shall deliver to A.I.D. within 120 days after the close of each fiscal year of AFCC:

(a) Two (2) copies each of the balance sheet of AFCC as at the end of such fiscal year, the related statement of

profit and loss for such fiscal year and any reports prepared for distribution to AFCC's ^{SHARE} ~~stock~~holders. Such balance sheet and statement of profit and loss shall also set forth the corresponding data for the immediately preceding fiscal year. Such balance sheet and statement of profit and loss shall be in reasonable detail, certified by an independent accountant satisfactory to A.I.D., and prepared in accordance with generally accepted accounting principles.

(b) A certificate by an independent accountant satisfactory to A.I.D. stating: (i) that he has reviewed this Agreement and the transactions, operations and conditions of AFCC for the fiscal year then ended; (ii) whether or not his review has disclosed in his opinion the existence of any event or condition which constitutes or has constituted a breach of AFCC's obligations hereunder, and (iii) setting forth computations as to AFCC's compliance during the period reviewed with Sections 3.06, 3.07, 3.08, 3.09, 3.10(a)(i) and (iii) hereof.

(c) Two (2) copies of an Annual Progress Report prepared by AFCC and certified by the Managing Director which shall include (i) a review (including data) of AFCC's operations and activities during the Report year with particular emphasis on those affecting its financial condition, (ii) a projection of such operations and activities (including corresponding data) for the next succeeding fiscal year and such additional period

as may be appropriate in the light of the current status of the Project, and (iii) comments on any other relevant and significant developments with respect to the Project, including construction of physical facilities and their estimated date of completion.

Section 3.06. Restrictions on Incurring Long-Term Debt.

AFCC shall not, after the Commercial Operation Date, incur or have outstanding any long-term debt if:

(a) After such incurrence, the aggregate principal amount of the AFCC's outstanding long-term debt exceeds 150 percent the AFCC's net worth; or

(b) If AFCC's net revenue for the fiscal year immediately preceding its incurrence shall be less than 150 percent of the maximum debt service requirements for any succeeding fiscal year on all its long-term debt then outstanding (including the debt to be incurred).

Section 3.07. Restrictions on Capital Expenditure. AFCC shall not, prior to the Commercial Operation Date, make expenditures, or commitments for expenditures, for capital additions except expenditures, or commitments for expenditures, required for the carrying out of the Project and, for the three year period following the Commercial Operation Date, AFCC shall not make any such expenditures or commitments except:

(a) Expenditures, or commitments for expenditures, required for operation of the Plant or repair, maintenance or replacement of assets;

(b) Investments in short-term marketable securities solely for the purpose of temporarily employing funds at the time not required to be held as cash; and

(c) Other expenditures, or commitments for expenditures, not exceeding in the aggregate the equivalent of \$3,000,000 in any fiscal year.

Section 3.08. Depreciation.

All depreciable assets of AFCC shall be fully depreciated in conformity with generally accepted accounting principles applied on a consistent basis and, without limitation thereto, the depreciable fixed assets included in the Plant relating to manufacturing operations shall be fully depreciated within a period of twelve years starting at the close of the fiscal year during which such assets are placed into service.

Section 3.09. Restrictions on Dividends. ^{RESTRICTIONS} ~~Except as~~
WITH RESPECT TO DIVIDENDS SHALL BE AS FOLLOWS:
~~A.I.D. shall otherwise agree in writing:~~

(a) AFCC shall not take any of the actions referred to in paragraph (c) of this Section until the expiry of a period of one year from the Commercial Operation Date;

(b) AFCC shall not declare any dividend or make any other distribution with respect to its share capital except out of its accumulated adjusted net earnings; and

(c) AFCC shall not pay any dividend or make any other distribution with respect to its share capital (other than dividends or distributions payable solely by way of the transfer of additional share capital of AFCC to its shareholders in proportion to their holdings of AFCC's existing share capital at the time) or purchase, redeem or otherwise acquire, directly or indirectly for any consideration, any of such share capital, or such additional share capital, or otherwise reduce its outstanding share capital or prepay any long-term debt if, after giving effect to such action, the ratio of current assets to current liabilities would be less than 1.5:1.

Section 3.10. Asset to Liability Ratio; Use of Revenues.

(a) AFCC shall take such action as shall be necessary, as from the Commercial Operation Date: (i) to maintain a ratio of current assets to current liabilities of at least 1.5:1; (ii) to meet out of its sales revenue in each fiscal year its full operating, administrative and distribution expenses including adequate provisions for maintenance, depreciation, taxes, surcharges and other levies and interest on debt, and to earn in respect of each such year a reasonable rate of return, after taxes, on its net worth, and (iii) to maintain a ratio of outstanding long-term debt to net worth of not more than 1.5:1.

(b) For the purposes of sub-paragraph (a)(ii) of this Section, and Section 3.08, assets of AFCC shall be revalued in accordance with generally accepted accounting principles.

Section 3.11. A.I.D. Waiver. Deviations from the provisions of this Article III may be made only after agreement by A.I.D. in writing.

ARTICLE IV

Effective Date; Termination

Section 4.01. Effective Date. This Agreement shall come into force and effect on the date on which the Loan Agreement shall come into force and effect. A.I.D. shall promptly notify AFCC of such date.

Section 4.02. Termination. This Agreement and the obligations of the parties hereunder:

(a) Shall terminate on the date on which the Loan Agreement shall terminate in accordance with its terms, or the fifteenth anniversary of the date of this Agreement, whichever first occurs; and

(b) Shall not be affected by any cancellation or suspension under the provisions of the Loan Agreement.

ARTICLE V

Miscellaneous

Section 5.01. Communications. Any notice or request required or permitted to be given or made under this Agreement and any agreement between the parties contemplated by this Agreement shall be in writing. Such notice or request shall

be deemed to have been duly given or made when it shall be delivered by hand or by mail, telegram, cable, radiogram or telex to the party to which it is required or permitted to be given or made at its address hereinafter specified, or at such other address as such party shall have designated by notice to the party giving such notice or making such request. The addresses so specified are:

For A.I.D.

USAID Bangladesh Office
American Embassy
Adamjee Court
P. O. Box 323, Ramna
Dacca-2, Bangladesh

Cable Address:

USAID
Dacca

For AFCC:

Ashuganj Fertilizer and Chemical Company Limited
43 Dilkhusha
Commercial Area
Dacca-2
Bangladesh

Cable Address:

SECTION 5.02. Authorized Action By AFCC; Representatives.

(a) Any action required or permitted to be taken, and any documents required or permitted to be executed, under this Agreement or the Loan Agreement or on behalf of AFCC may be taken or executed by its Managing Director or by such other person or persons as he shall so designate in writing notified to A.I.D.

(b) AFCC shall furnish to A.I.D. sufficient evidence of the authority of each person who will act under paragraph (a) of this Section, together with the authenticated specimen signature of each such person.

SECTION 5.03. Non-waiver of Rights. No delay in exercising, or omission to exercise, any rights, power or remedy accruing to either party under this Agreement upon any default shall impair any such right, power or remedy or be construed to be a waiver thereof or an acquiescence in such default, nor shall the action of such party in respect of any default, or any acquiescence in any default, affect or impair any right, power or remedy of such party in respect of any other or subsequent default.

IN WITNESS WHEREOF the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and to be delivered at the principal office of A.I.D., as of the day and year first above written.

UNITED STATES OF AMERICA

By_

ASHUGANJ FERTILIZER AND
CHEMICAL COMPANY LIMITED

By _____
Authorized Representative

DRAFT

November 8, 1974

ASHUGANJ FERTILIZER PROJECT:
MEMORANDUM OF AGREEMENT REGARDING PROJECT EXECUTION,
PROCUREMENT AND USE OF LOAN FUNDS

1.1. (a) The Federal Republic of Germany has enabled the Kreditanstalt für Wiederaufbau ("KfW") to lend the People's Republic of Bangladesh (the "Government") DM30,000,000 in untied funds repayable over fifty years including ten years' grace at an interest rate of 3/4% per year.

(b) The Government of Switzerland ("GOS"), subject to compliance with constitutional requirements, intends to lend Bangladesh SwF20,000,000 in untied funds repayable over forty years including ten years' grace subject to a service charge of 1% per year.

(c) The United Kingdom of Great Britain and Northern Ireland, acting through the Ministry of Overseas Development ("ODM") will grant and lend Bangladesh £8,000,000 in tied funds, 65% of which is repayable over 25 years including seven years' grace and no interest.

(d) The United States of America, acting through the Agency for International Development ("AID") will lend Bangladesh \$30,000,000 in funds, eligible for procurement in the United States and eligible developing countries, repayable over forty years including ten years' grace at an interest rate of 2% per year during the grace period and 3% per year thereafter.

(e) The Asian Development Bank ("ADB") will lend Bangladesh the equivalent of \$30,000,000 in special funds eligible for procurement in the countries contributing to its special fund repayable over forty years

including ten years' grace subject to a service charge of 1% per year.

(f) The International Development Association ("IDA") will lend Bangladesh the equivalent of \$33,000,000 in funds eligible for procurement in IDA's member countries and Switzerland repayable over fifty years including ten years' grace subject to a service charge of 3/4% per year.

(g) _____ ("_____") will lend Bangladesh _____ [equivalent to not less than \$12.4 million] in untied funds repayable over _____ years including _____ years' grace at an interest rate of _____% per year.

(h) The loans, grant and credit described above are: (i) subject to agreements between each of these lenders (the "Lenders") and the Government and in some cases between Lenders and the Ashuganj Fertilizer and Chemical Company Limited ("the Company"), and (ii) were equivalent in the aggregate to about \$142 million in November 1974 which was at the time estimated to be the foreign exchange cost of the Project, the total cost of which was estimated at \$249 equivalent.

(i) The loans, grant and credit have been made to enable the Government, through the Company, to carry out a project consisting of the construction and operation of a fertilizer plant (the "Plant") at Ashuganj. A full description of the project (the "Project") is set forth in the agreements between each lender and the Government.

1.2. It has been necessary to formulate a plan for Project execution and the use of funds satisfactory to all concerned parties which will permit the Project to be carried out in an economic and efficient manner while taking into account the nature and limitations of available funds. The purpose of this Memorandum is to set forth in general terms an appropriate plan for Project execution, including coordination among the Lenders, and procedures for procurement of the goods and services required for the Project,

and for allocation of the foreign exchange cost of contracts so procured among the loans, credits and grants made available by the various Lenders.

II Site Development Contract, General Contractor and Technical Assistance

Site Development Contract and General Contractor

2.1. The Lenders have no objection to the contract for development of the site for the Plant with the Vinnell Corporation, dated October 8, 1974. (The following material regarding the procurement of the General Contract reflects the situation on November 8, 1974 when this Memorandum of Agreement was negotiated.) The Company will employ a suitably qualified and experienced engineering firm (the "General Contractor") to provide requisite process licenses, to be responsible for plant design and detailed engineering, to manage procurement, to construct, or to supervise the construction of, the Plant, to conduct the start up and guarantee tests therefor, and to assist the Company in training staff to operate the Plant. The General Contractor will be selected from prequalified firms through international competitive bidding in a manner which will insure the eligibility of the contract between the Company and the General Contractor (the "General Contract") for financing by ODM and/or IDA; and the terms and conditions of the General Contract will be such that the Company's payments to the General Contractor for its services will be eligible for financing by ODM and/or IDA. Selection of the General Contractor with whom negotiations will take place will depend on which proposal would be most advantageous to the Company, taking into account previous experience, design, operating efficiency, price and other relevant factors. The Contract will be carried out on a cost plus fixed fee basis, the fee covering all services (including the remuneration of expatriate personnel) to be rendered by the Contractor. Prequalification has been completed,

and the Lenders have approved the invitation to bid for the General Contract. IDA and ADB, in addition to the Technical Advisor and the Company, will receive copies of all bids submitted. The report on evaluation of bids of the Technical Advisor, and any subsequent report in this respect by the Company, BFCPC or the Borrower, and the proposal to award the General Contract, will be submitted simultaneously to each Lender promptly on their completion. The General Contract will be subject to the approval of all Lenders. The Company will keep IDA informed of the status of negotiations of the General Contract. To expedite the Lenders' consideration and approval of the General Contract as negotiated, the Company shall convey directly to the Lenders details of any changes as negotiated to the agreed draft. IDA however will receive the comments of the other Lenders on these changes and convey their views to the Company. The General Contract will not finally be signed until all the Lenders' requirements as reflected by their comments have been met.

Technical Advisor

2.2. A joint venture group assembled by Scientific Design Company Ltd. and James Chemical Engineering has been appointed by the Company to act as "Technical Advisor". Any substantial change in the terms of the Technical Advisor's contract (entered into with BFCPC and assigned to the Company) will be subject to the approval of the Lenders. The Technical Advisor has prepared basic design criteria and engineering and construction standards for the Plant and has consolidated them into specifications for tender for the General Contract. The Technical Advisor has prepared invitations and bidding documents for this contract in conformity with the requirements of the relevant Lenders, and will assist the Company in the selection of the General Contractor, analyze bids received, and made recommendations for award. Thereafter, the Technical Advisor will on behalf of the Company

monitor and supervise the General Contractor as necessary. The Technical Advisor will also assist the Company in satisfying the procurement requirements of the various Lenders. Upon mechanical completion of the Plant, the Technical Advisor will participate in performance testing and Plant takeover. In addition, the Technical Advisor will assist the Company in identifying and choosing an appropriate firm(s) to assist the Company during project implementation, initial operations and training. The Technical Advisor's costs will be financed by IDA through an existing technical assistance credit and the credit for this Project.

Management Assistance

2.3. To obtain management assistance during the Plant construction period and during the initial years of operation, a management assistance contract(s) acceptable to the Company and the Government will be concluded as soon as practicable. Procedures similar to those described in paragraph 2.1 above will be implemented to ensure that the management assistance contract(s) is acceptable to all Lenders and to coordinate the views of all Lenders, including channelling of Lenders' comments through IDA.

III Procurement

3.1. The purpose of this section is to establish guidelines for the procurement of goods and services for the Project which will insure the full utilization of external funds consistent with considerations of economy and efficiency. The Company and the Technical Advisor will insure that the General Contractor prepares, on the basis of this Memorandum and of further

Information to be supplied to him by each Lender as to the specific eligibility requirements of the various Lenders for financing under their loans, a detailed description of the procurement procedures which will be followed for the Project. In preparing such description the General Contractor may recommend such modifications in the procedures and allocations set forth in this Memorandum as he may consider appropriate for the efficient and economic execution of the Project. The description of the procurement procedures for items allocated to specific Lenders and any proposed changes in allocations will be prepared by the General Contractor and will be furnished by the Company to each of the relevant Lenders. The description of procurement procedures for unallocated items will be so furnished to GOS, ODM, AID and IDA. The procurement procedures will come into operation when accepted by the respective Lenders.

Ammonia Plant Equipment

3.2 The f.a.s cost of all ammonia plant equipment will be financed, up to an amount of \$30 million equivalent, by ADB. Consequently, ammonia plant equipment up to this limit will be procured in accordance with ADB's procurement requirements for the use of its special funds. If ADB funds made available for the Project are not entirely committed for this purpose, ADB will make them available for the cost of freight and insurance for the ammonia plant equipment and catalysts and chemicals for the ammonia plant, consistent with its procurement requirements. Otherwise freight and insurance for the ammonia plant equipment will be financed by IDA and such other Lenders as have funds available for this purpose. If it should appear that ADB funds will not be sufficient to cover all the costs of such equipment, the procurement procedures described in paragraph 3.6 below will be followed in respect

of equipment for which no ADB funds are available.

Urea Plant Process Equipment

3.3. All urea plant process equipment will be financed, up to the equivalent of DM30,000,000, on a c. & f. basis or, subject to coordination with other lenders, on an f.o.b. basis by KfW. International competitive bidding consistent with KfW's requirements will be used to procure this equipment, but if it appears some such equipment cannot be financed by KfW as the result of the exhaustion of its funds committed to the Project, the procedures described in paragraph 3.6 below will be followed.

General Contract

3.4. One half the foreign exchange cost of the General Contract, or such higher proportion as may be agreed between ODM and IDA, will be financed by ODM if the General Contractor is a U.K. firm. Any amounts not so financed will be financed by IDA.

Certain Other Equipment

3.5. If the General Contract is not won by a U.K. firm, ODM will finance the equipment described in Annex A to this Memorandum. In such case, Annex A equipment will be procured on the basis of competitive bidding within the U.K. consistent with ODM's requirements. AID will finance the equipment and services described in Annex B to this Memorandum. Annex B equipment will be procured on the basis of competitive bidding consistent with AID's requirements within the U.S. and less developed countries eligible for AID financing.

Remaining Goods and Services

3.6. All other goods and services (except consulting services) required for the project to be financed by the Lenders will be procured pursuant to procedures, and covered by contracts, which will enable them to be financed

by either GOS, ODM, AID or IDA. Such procedures will be developed by the General Contractor, under the supervision of the Company assisted by the Technical Advisor, with the cooperation of GOS, ODM, AID and IDA, and will be acceptable to these Lenders. If the lowest evaluated bid for an item is submitted by a firm eligible for ODM or AID financing, it will be submitted to ODM or AID for approval and, if approved for financing, the resulting contract will comply with either ODM's or AID's requirements. Otherwise IDA's procedures for award and contracting will be followed. Contracts approved by IDA for financing may be financed by GOS or IDA, in accordance with fund availability, and using such procedures as may be agreed between them from time to time.

3.7. If in the course of execution of the General Contract, IDA considers

- (a) that certain items of equipment, such as process-critical items, are by their nature not appropriate for international competitive bidding; or
- (b) that insufficient funds remain unallocated from GOS and IDA to finance the estimated foreign exchange cost of items still to be procured by the General Contractor; or
- (c) that although sufficient funds may remain unallocated from GOS and IDA, procurement of certain items could without prejudice to the principle of economy and efficiency be restricted to one or more countries which are eligible sources for financing under the ODM or AID loans;

then IDA may, in consultation with the Government of Bangladesh and with such of the other Lenders as still have funds available under their loans, determine that procurement of all or part of contracts not yet awarded will

be restricted to such country or countries as IDA and the Government of Bangladesh shall agree with the relevant Lenders to be appropriate.

3.8. Goods and services to be financed solely out of local funds will be procured in accordance with procedures which will insure adequate competition.

IV Coordination, Information and Miscellaneous

4.1. The General Contractor will periodically inform all Lenders, the Government of Bangladesh and the Company of the contracts allocated to each Lender for the Project and their estimated value. Without undertaking liability to other Lenders, each Lender will periodically inform IDA of the amounts disbursed by it for the various components of the Project. The Company will keep an account of the amounts of financing to be made available by the Lenders which have been allocated to particular contracts, of the amounts disbursed therefor and of the amounts otherwise available and will periodically inform the other Lenders, the Government and the Company.

4.2. Without undertaking any liability to other Lenders: The Lenders will consult with each other as often as any of them wish in order to insure the successful implementation of the Project. If possible, the Lenders will coordinate their visits to Bangladesh for purposes of discussing the Project so as to reduce administrative burdens on the Company and to afford the Lenders increased opportunities for consultation among themselves. Following such visits, each Lender will furnish the other Lenders with a report regarding such visits. Before any Lender gives any consent or approval, or makes any waiver, or conveys its views to the Company regarding nomination of officials of the Company (other than routine approvals or waivers given in the course of loan administration) pursuant to its agreement(s) with the Government or the Company in respect of the Project, such Lender will consult with the other Lenders. Each Lender will promptly

Inform all other Lenders (i) of any substantial default by the Government or the Company under the agreement(s) between such Lender and the Government or the Company in respect of the Project, and (ii) of any circumstances which could adversely affect the implementation of the Project or which could impede or seriously jeopardize its financing. No Lender will suspend or cancel its funding of the Project or materially modify its agreement with Bangladesh in respect of the Project without first informing and, to the extent possible, consulting with all other Lenders.

4.3. This Memorandum of Agreement will become effective (a) among all Lenders other than GOS on the date on which IDA notifies the other Lenders that IDA has approved, and has received letters stating the approval by all such parties (other than GOS), of the terms of this Agreement, and (b) among all Lenders on the date on which IDA, having given such notification, has received such a letter from GOS and has given further notification to this effect. This Agreement shall lapse upon completion of the Project.

4.4. Communications among the Lenders may be addressed, until further notice, to the addresses listed in Annex C hereto.

ANNEX A

EQUIPMENT SUBJECT TO ALLOCATION TO ODM

(Paragraph 3.5)

4 (b) Power, Inst. Air, Plant Air,
Boiler, I. Gas

4 (a) Substation, Dist. Lighting

5 (a) Conveyers

5 (c) Ship Loader

5 (f) Locomotive

7 (c) Maintenance Machinery

7 (b) Lab. Canteen

5 (b) Recovery from Bulk Store

9 (c) Fire Station & Services

(Number and letter references are to Annex 5-1 of IDA's appraisal report on the Project.)

ANNEX A

EQUIPMENT SUBJECT TO ALLOCATION TO ODM

(Paragraph 3.5)

- 4 (b) Power, Inst. Air, Plant Air,
Boiler, I. Gas
- 4 (a) Substation, Dist. Lighting
- 5 (a) Conveyers
- 5 (c) Ship Loader
- 5 (f) Locomotive
- 7 (c) Maintenance Machinery
- 7 (b) Lab. Canteen
- 5 (b) Recovery from Bulk Store
- 9 (c) Fire Station & Services

(Number and letter references are to Annex 5-1 of IDA's appraisal report on the Project.)

ANNEX B

EQUIPMENT ALLOCATED TO AID
(Paragraph 3.5)

Site development contract

4 (b) Ammonia Storage Refrig. and Bottling

4 (c) Cond. Stripp., Water Treat. C Tower

4 (e) Sewer and Effluent Treatment

6 Construction Equip.

7 (d & h) Boats and Vehicles

5 (d) Bagging

5 (e) Bag Lining Machine

(Number and letter references are to Annex 5-1 of IDA's appraisal report on
the Project.)

ANNEX I

Kreditanstalt für Wiederaufbau
Palmengartenstrasse 5-9
6 Frankfurt/Main
Germany

Cable: KREDITANSTALT Frankfurt/Main
Telex: 411352

Division of Commerce
Federal Department of Public Economy
Berne
Switzerland

Cable: COMMERCE, Berne

Ministry of Overseas Development
Fland House, Stag Place
London S.W. 1E 5 DH
England

Cable: MINISTRANT, London

Agency for International Development
NESA/CD
Department of State
Washington, D.C. 20523
United States of America

Cable: USAID, Washington, D.C.

Asian Development Bank
P.O. Box 789
Manila
Philippines

Cable: ASIANBANK, Manila
Telex: 7222094(RCA); 7425071(ITT); 3587(Eastern)

International Development Association
1813 H Street, N.W.
Washington, D.C. 20433
United States of America

Cable: INDEVAS, Washington, D.C.
Telex: 440098(ITT); 248423(RCA); 64145(Western Union)

ANNEX C

Kreditanstalt für Wiederaufbau
Palmengartenstrasse 5-9
6 Frankfurt/Main
Germany

Cable: KREDITANSTALT Frankfurt/Main
Telex: 411352

Division of Commerce
Federal Department of Public Economy
Berne
Switzerland

Cable: COMMERCE, Berne

Ministry of Overseas Development
Eland House, Stag Place
London S.W. 1E 5 DH
England

Cable: MINISTRANT, London

Agency for International Development
NESA/CD
Department of State
Washington, D.C. 20523
United States of America

Cable: USAID, Washington, D.C.

Asian Development Bank
P.O. Box 789
Manila
Philippines

Cable: ASIANBANK, Manila
Telex: 7222094(RCA); 7425071(ITT); 3587(Eastern)

International Development Association
1818 H Street, N.W.
Washington, D.C. 20433
United States of America

Cable: INDEVAS, Washington, D.C.
Telex: 440098(ITT); 248423(RCA); 64145(Western Union)

CHECKLIST OF STATUTORY CRITERIA

In the right-hand margin, for each item, write answer or, as appropriate, a summary of required discussion. As necessary, reference the section(s) of the Capital Assistance Paper, or other clearly identified and available document, in which the matter is further discussed. This form may be made a part of the Capital Assistance Paper.

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended.

FAA, 1973 - Foreign Assistance Act of 1973.

App. - Foreign Assistance and Related Programs Appropriation Act, 1974

MMA - Merchant Marine Act of 1936, as amended.

BASIC AUTHORITY

2. FAA § 103; § 104; § 105;
§ 106; § 107. *Is loan being made*

The loan is being made to help Bangladesh improve agriculture, rural development and nutrition by financing an increase in the capability to produce fertilizers. It will contribute directly to increasing foodgrain yields.

a. *for agriculture, rural development or nutrition;*

b. *for population planning or health;* Not applicable.

c. *for education, public administration; or human resources development;* Not applicable.

d. *to solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development;* Not applicable.

AID 1240-2 (5-74)

e. in support of the general economy of the recipient country or for development programs conducted by private or international organizations.

Not applicable.

COUNTRY PERFORMANCE

Progress Towards Country Goals

2. FAA §201 (b) (5), (7) & (8); § 208

A. Describe extent to which country is:

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

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

Increasing food grain production is one of the major objectives of the Bangladesh Five Year Plan. Rice production targets show an increase of 30% during the Plan. Included in the Plan are programs for storage and marketing of food. Despite budget costs forced up by soaring import costs, major agricultural development programs are moving forward essentially intact.

The BDG official policy is to encourage foreign private enterprise and investment, although the policy contains some restrictions which has thus far limited investment from these quarters.

AID 1240-2 (5-74)

(3) *Increasing the public's role in the developmental process*

Implementation of Bangladesh's development plans require increasing the public's role in development. A key rural development program involves the use of two tier cooperatives with elected officers as a means of involving the populace in development as well as extending information on upgrading agricultural and provision of credit. The rural works program also requires a high degree of local decision-making and participation.

(4) (a) *Allocating available budgetary resources to development.*

Bangladesh's budgetary resources are overwhelmingly allocated to relief, reconstruction, rehabilitation and development expenditures.

(b) *Diverting such resources for unnecessary military expenditure (See also Item No. 20) and intervention in affairs of other free and independent nations.) (See also Item No. 11)*

Bangladesh's military expenditures are low and the country concentrates its energies on domestic concerns.

(5) *Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.*

Bangladesh is a nation of small landowners with a landholding system more equitable than most LDC's. Although independent for only two years, the Government has written a constitution, held parliamentary elections and local elections. The country-side is still rather unsettled after the war, and the Government has recently been taking actions to improve law and order.

(6) *Willing to contribute funds to the project or program.*

The Bangladesh Government will supply the local costs of the Project in the sum of 2107 million equivalent as well as undertake financing of related changes in present distribution and marketing systems.

AID 1240-2 (5-74)

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

The Bangladesh Government is responding to the vital economic, political and social concerns of its people. It has a firm determination to come to grips with the appalling economic problems facing Bangladesh and take action.

B. *Are above factors taken into account in the furnishing of the subject assistance?*

Yes

Treatment of U.S. Citizens and Firms.

3. *FAA § 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?*

At the present time the BDG is not known to be in violation of the requirements of this section.

4. *FAA § 620(c)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?*

At the present time the BDG is not known to be in violation of the requirements of this section.

AID 1240-2 (5/74)

5. FAA § 620(o); Fishermen's Protective Act. § 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters,

The BDG has not taken such action.

a. has any deduction required by Fishermen's Protective Act been made?

Not applicable

b. has complete denial of assistance been considered by A.I.D. Administrator?

Not applicable

Relations with U.S. Government and Other Nations

6. FAA § 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?

We are not aware of any BDG non-compliance with this section.

AID 1240-2 (5-74)

7. FAA § 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? The Secretary of State has determined that the BDG is not controlled by the International Communist movement.
8. FAA § 620(d). If assistance is for any productive enterprise which will compete in the United States with United States enterprise, is there an agreement by the recipient country to prevent export to the United States of more than 20% of the enterprise's annual production during the life of the loan? The productive enterprise involved under this loan will not compete in the US with US enterprise.
9. FAA § 620(f). Is recipient country a Communist country? No
10. FAA § 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? (a) No (b) No
11. FAA § 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? No

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12. FAA § 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, in convertibility or confiscation, has the A.I.D. administration within the past year considered denying assistance to such government for this reason?
- Bangladesh is a newly independent country which has not yet instituted such a program. However, a draft OPIC bilateral agreement has been submitted to the BDG and the BDG has expressed strong interest in establishing this program. Thus the A.I.D. Administration has not considered denying assistance for this reason.
13. FAA § 620(n). Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam?
- We are not aware of any BDG non-compliance with this section.
14. FAA § 620(q). Is the government of the recipient country in default on interest or principal of any A.I.D. loan to the country?
- No
15. FAA § 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?
- No, not applicable.
16. FAA § 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the A.I.D. Administrator in determining the current A.I.D. Operational Year Budget?
- Bangladesh is not in arrears.

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17. FAA § 481. Has the government of recipient country failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? No

18. FAA, 1973 § 29. If (a) military base is located in recipient country, and was constructed or is being maintained or operated with funds furnished by U.S., and (b) U.S. personnel carry out military operations from such base, has the President determined that the government of recipient country has authorized regular access to U.S. correspondents to such base? There is no such military base in Bangladesh.

Military Expenditures

19. FAA § 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).) There are no considerations under section 620(s) which would prohibit assistance to Bangladesh. Bangladesh's military expenditures are low, probably among the lowest of all LDC's by any standard. The Soviet Union has provided a limited amount of aircraft for Bangladesh Air Force. This equipment is purchased on credit at below "market prices." The country is not diverting development assistance to military expenditures.

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CONDITIONS OF THE LOAN

General Soundness

20. FAA § 201(d). Information and conclusion on reasonableness and legality (under laws of country and the United States) of lending and relending terms of the loan.

Bangladesh is a relatively lesser developed country. The loan terms are 2 percent during a ten-year grace period and 3 percent for the balance of the 40-year repayment period. This is the minimum rate required by United States law and is a legal interest rate in Bangladesh.

The relending terms are also legal and appropriate under the laws of both countries.

21. FAA § 201(b)(2); § 201(e)

Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to A.I.D. an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

This loan is being made pursuant to a multilateral plan.

22. FAA § 201(b)(2) Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

See Section XII of the Capital Assistance Paper.

25. FAA § 201(b)(1) Information and conclusion on availability of financing from other free-world sources, including private sources within the United States.

No other US source of finance is available for this loan. To the extent possible, other assistance from six donors is helping to meet the financing requirements of this Project.

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24. FAA § 611(a)(1). Prior to signing of loan will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the United States of the assistance?

(a) Financial and other plans necessary to carry out the assistance are completed including the general construction information for bidders containing detailed specifications for the Project.
(b) the cost of assistance to the United States is limited to the amount of the loan.

25. FAA § 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of loan?

No such legislative action is required.

26. FAA § 611(e). If loan is for Capital Assistance, and all U.S. assistance to project now exceeds \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

Yes. See Annex 25 to the Capital Assistance Paper.

Loan's Relationship to Achievement of Country and Regional Goals

27. FAA § 207; § 113
Extent to which assistance reflects appropriate emphasis on: (a) encouraging development of democratic, economic, political, and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs;

The loan has the indirect effect of encouraging institutional development for distribution of agricultural inputs and rural development and contributes directly towards meeting Bangladesh's food-grain needs. The loan is also directed toward improving availability of trained manpower. The loan will enlarge on an existing industry which Bangladesh, by reason of its natural resources, is in a favorable position to develop. The loan will also help co-operatives meet farmers' fertil-

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(e) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or
(f) integrating women into the recipient country's national economy.

izer requirements. It will have no direct impact on integrating women into the economy.

28. FAA § 209. Is project susceptible of execution as part of regional project? If so why is project not so executed?

No. The project is not so susceptible.

29. FAA § 201(b)(4) Information and conclusion on activity's relationship to, and consistency with, other development activities, and its contribution to realizable long-range objectives.

The loan is fully consistent with major objectives of the Bangladesh Five Year Development Plan: in increasing foodgrain production, which requires increases in yields and cropping intensities. It is also consistent with U.S. objectives in increasing agricultural production and rural development.

30. FAA § 201(b)(9) Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.

The activity will definitely contribute towards the development of the national and rural economy and increased food production, without which self sustaining growth in Bangladesh is impossible.

31. FAA § 209;
Information and conclusion whether assistance will encourage regional development programs.

Not applicable. This is not a goal of this Loan.

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32. FAA § Section 111. Discuss the extent to which the loan will strengthen the participation of the urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.
- By increasing the availability of fertilizers, rural small farmers will be able to increase food production and income. An increasing amount of fertilizer will be channelled through the equivalent of county wide cooperative federations or village level primary cooperatives.
33. FAA § 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.
- Increased agricultural production is essential to Bangladesh's economic development. In order to increase production and foodgrain yield per acre, increased quantities and timely availabilities of agricultural inputs such as fertilizers are required.
34. FAA § 281(a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions.
- Agricultural Inputs are required for implementation of the BDG's agricultural and rural development strategy, since they facilitate obtaining increased food yields. The strategy is based upon the development of the two tiered cooperative system, which stresses participation of the rural populace.
35. FAA § 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.
- The loan has relationship, (see above) to the rural development program stressing the two tiered cooperatives. These coops require considerable participation by the local population if they are to be successful. The managing committees at village and Thana (county) federation level are elected. In addition, the cooperatives will be involved in the distribution of fertilizer, and will provide loans to farmers for purchase of fertilizer.
36. FAA § 201(b)(3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities?
- The Project will require further utilization of natural and human resources as well as forging refinement of fertilizer distribution

and marketing systems.

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37. FAA § 602(a). Information and conclusions whether loan will encourage efforts of the country 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.

The loan will increase foreign trade since the needed materials will be additional to what Bangladesh would otherwise finance. Since licensed sellers distribute fertilizer, it will facilitate private initiative of traders as well as farmers. It does help cooperative development, since coops are involved in distribution of fertilizer and will provide credit for purchase of agricultural inputs. Such inputs do improve the technical efficiency of agriculture sector. The loan is not directed toward strengthening free labor unions.

38. FAA § 619. If assistance is for newly independent country; is it furnished through multilateral organizations or plans to the maximum extent appropriate?

Yes.

Loan's Effect on U.S. and A.I.D. Program

39. FAA § 201(b)(6) Information and conclusion on possible effects of loan on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving the U.S. balance of payments position.

The loan will attempt to finance goods and services substantially of US source and origin. The site-development contract has been awarded to a US firm. The loan should have no adverse effects upon the economy of the US. No information can be developed as to whether any specific labor surplus will be benefitted.

40. FAA § 202(a) Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprises, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.

The loan will finance the procurement of labor and construction material from private enterprise. The loan, however, will be made to the government and relent to a wholly owned government company.

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41. FAA § 601(b). *Information and conclusion on how the loan will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).* The loan will finance and encourage the export of US commodities and services. The site development contract has been awarded to a US firm and, because of the nature of other goods and services to be financed for the entire Project, the US will be a substantial supplier - even of goods financed by other donors.
42. FAA § 601(d). *If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest?* Yes.
43. FAA § 602. *Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services financed by the loan.* Normal Small Business notification will be required in the implementation of the loan.
44. FAA § 620(h). *Will the loan promote or assist the foreign aid projects or activities of the Communist-Bloc countries?* No.
45. FAA § 621. *If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on* The loan will not finance technical assistance though other donors will finance such assistance as part of the project. The USA will be used in some phases of the project but will not compete with US private enterprise or interfere with domestic programs.

whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs.

Loan's Compliance with Specific Requirements

46. FAA § 110(a); § 208(c). In what manner has or will the recipient country provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the loan is to be made?
- This project being multilaterally financed, these statutory provisions are inapplicable.
47. FAA § 112. Will loan be used to finance police training or related program in recipient country?
- The loan will not be used for such purpose.
48. FAA § 114. Will loan be used to pay for performance of abortions or to motivate or coerce persons to practice abortions?
- No.
49. FAA § 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.
50. FAA § 201(d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter?
- Yes.
51. FAA § 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise?
- Very little. Certain local goods and services will be used in construction and operation of the plant but the plant will be owned by the government.
52. FAA § 604(a). Will all commodity procurement financed under the loan be from the United States except as otherwise determined by the President?
- It is contemplated the donors to the project will adhere to their own source and origin rules. AID financing will be tied to Code 041.
53. FAA § 604 (b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price?
- The implementation of the loan agreement will prohibit loan funds to be used for such financing.

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54. FAA § 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the United States on commodities financed by the loan? Yes, the Loan Agreement shall so provide.
55. FAA § 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? No such commodities or products are contemplated to be financed.
56. FAA § 604(f). If loan finances a commodity import program, will arrangements be made for supplier certification to A.I.D. and A.I.D. approval of commodity as eligible and suitable? Not applicable.
57. FAA § 608(a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items. Not applicable.
58. FAA § 611(b); App. § 101. If loan finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962? Not applicable.

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59. FAA § 611(c). If contracts for construction are to be financed, what provision will be made that they be let on a competitive basis to maximum extent practicable? With the exception of relatively small items, competitive procedures will be used for all project procurement.
60. FAA § 612(b); § 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the United States are utilized to meet the cost of contractual and other services. The U.S. does not own a significant amount of Bangladesh taka which could be used in this project. The Bangladesh Government will contribute the amount of local currency required for this project.
61. App. § 113. Will any of loan funds be used to acquire currency of recipient country from non-U.S. Treasury sources when excess currency of that country is on deposit in U.S. Treasury? No. Bangladesh is not an excess currency country.
62. Section 30 and 31 of PL 93-189 (FAA of 1973). Will any part of the loan be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, North Vietnam, South Vietnam, or Thailand? No.
63. Section 37 of PL 93 - 189 (FAA of 1973); App. § 111. Will any part of this loan be used to aid or assist generally or in the reconstruction of North Vietnam? No.
64. FAA § 612(d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release? See Paragraph 61 above.
65. FAA § 620(g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property? The loan will not be used for this purpose, but only for the purchase of goods and services needed for the project.

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66. FAA § 620(k). If construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed \$100 million? No.
67. FAA § 636(i). Will any loan funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction? This loan will not finance the procurement of motor vehicles.
68. App. § 103. Will any loan funds be used to pay pensions, etc., for military personnel? No.
69. App. § 105. If loan is for capital project, is there provision for A.I.D. approval of all contractors and contract terms? Subject to a dollar value amount limit, those contracts and contractors financed by AID and the major contracts for the entire project will be so approved.
70. App. § 107. Will any loan funds be used to pay UN assessments? No.
71. App. § 109. Compliance with regulations on employment of U.S. and local personnel. (A.I.D. Regulation 7). The loan does not finance personnel costs.

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72. App. § 110. Will any of loan funds be used to carry out provisions of FAA §§ 209(d)? No.
73. App. § 112. Will any of the funds appropriated or local currencies generated as a result of AID assistance be used for support of police or prison construction and administration in South Vietnam or for support of police training of South Vietnamese? No.
74. App. § 114. Describe how the Committee on Appropriations of the Senate and House have been or will be notified concerning the activity, program, project, country, or other operation to be financed by the Loan. The loan was included in the FY 1974 Congressional Presentation at the level of \$ 25 Million. Congress will be notified of the \$ 5 Million increase in a timely fashion prior to authorization.
75. App. § 601. Will any loan funds be used for publicity or propaganda purposes within the United States not authorized by Congress? No.
76. App. § 604. Will any of the funds appropriated for this project be used to furnish petroleum fuels produced in the continental United States to Southeast Asia for use by non-U.S. nationals? No.
77. MMA § 201.b; FAA § 640C.

(a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed with funds made available under this loan shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.

Yes, the loan agreement shall contain such a requirement.

(b) Will grant be made to loan recipient to pay all or any portion of such differential as may exist between U.S. and foreign-flag vessel rates?

None is contemplated.

ENVIRONMENTAL IMPACT

Any approval of the environmental assessment of an AID financed capital project must take account of considerations relevant in the country where the project will be implemented. The highest reasonable standards should be applied and enforced, but would not be sensible to literally impose U. S. criteria and judgments.

There are presently no statutory regulations in Bangladesh for industrial effluents. The plant will be designed in accordance with European and U. S. standards in respect to solid, liquid and gaseous emissions. Mufflers will be required on noise polluting discharges. Noxious gas control devices within the plant will comply with European and U. S. standards, and first aid equipment will be strategically placed through the plant area as a safety measure in case of an accidental gaseous discharge. Training programs prescribed by the contract will include training in industrial hygiene and safety for key personnel as well as specialist technicians to be employed by the company for these inspection and enforcement activities. European and American standards require explosion proof electric motors in the plant.

The only raw material for the project is natural gas. The minute amounts of sulfur in the gas will be removed as either elemental sulfur or as a metallic sulfide, both of which have commercial value and will presumably be sold to manufacturing firms which require sulfur. The urea dust from the prilling tower will be recovered not only for environmental considerations, but because it is a valuable recoverable substance.

Since the plant will be built on reclaimed land, normally under water from the Meghna River during the rainy season, there will be little, if any, impact on human habitation or on productive farmland. However, environmental effects on the river system and its ecology resulting from the dredging operation required to provide fill for the plant site will be studied and appropriate measures shall be applied to minimize such effects. The housing colony adjacent to the plant will be provided with the necessary utilities and sewage facilities. Money for captive power has been included in the project cost. Water for the colony as well as for the plant will come from the Meghna River.

Water for the colony will be purified to meet U.S., WHO, or European standards. Ordinarily, water effluent from the plant is approximately 15° above inlet water temperature. A decision still has to be made whether there is enough water flow in the Meghna River during the dry season to handle the warm discharge without upsetting the ecology of the river. If there is any question about the water flow in the river during the dry season, water cooling towers will be installed to cool the water within a recirculating cooling water system. In any event, U. S. standards for cooling water discharges shall be met, especially as regards ambient water temperatures.