

~~3880016~~

~~388-0016~~

3880016-③
AAF-723-151

UNCLASSIFIED

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

PROJECT PAPER

Proposal and Recommendations
For the Review of the
Bilateral Assistance Subcommittee

BANGLADESH - ASHUGANJ FERTILIZER PLANT
Supplementary Project Financing

AID/BAS-028

UNCLASSIFIED

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

UNCLASSIFIED
AID/BAS-028
July 21, 1978

MEMORANDUM FOR THE BILATERAL ASSISTANCE SUBCOMMITTEE

SUBJECT: Bangladesh - Ashuganj Fertilizer Plant

Attached for your review are recommendations for authorization of a loan to the Peoples' Republic of Bangladesh ("Borrower") in an amount not to exceed Twenty-Three Million United States Dollars (\$23,000,000) to assist in financing the foreign exchange costs of goods and services required for site preparation, construction and commissioning of an ammonia/urea fertilizer plant at Ashuganj in Bangladesh ("Project"). The proposed loan is a supplement to the original loan of \$30.0 million provided in FY 75 and funds AID's pro rata sharing with the other lenders of the project cost overrun.

This loan proposal is scheduled for consideration by the Bilateral Assistance Subcommittee on Monday, July 31, 1978, at 2:30 p.m., in Room 3886 New State. If you are a voting member, a poll sheet has been enclosed for your response.

Working Group on Bilateral Assistance
Office of Policy Development and Program
Review

Attachments:

Summary and Recommendations
Project Analyses
Annexes A-F, H, I, J

UNCLASSIFIED

PROJECT PAPER

Ashuganj Fertilizer Paper

Table of Contents

PART I.	<u>SUMMARY AND RECOMMENDATION</u>	<u>PAGE</u>
	A. Project Face Sheet	5
	A-1. Introduction	5a
	B. Recommendations	6
	C. Description of the Project	6
	D. Project Status	11
	E. Issues	15
	F. Summary Findings	18
PART II.	<u>DISCUSSION OF PROJECT ELEMENTS</u>	19
	A. Site Problem	19
	B. Compensatory Foundations and Subcontracts	22
	C. Construction Materials	
	D. Construction Labor Supplies	23
	E. Procurement and Logistics	24
	F. Training and Preparation for Operations	26
PART III.	<u>TECHNICAL ANALYSES</u>	27
	A. Review of Fertilizer Requirements	27
	B. Financial Analysis	33
	C. Economic Analysis	34
	D. Financing Plan	46
	E. Other Aspects	54

<u>PART IV. IMPLEMENTATION PLANNING</u>	<u>PAGE</u>
A. Project Administrative Arrangements	55
1. Host Country Responsibilities	55
2. Role of A.I.D.	55
B. Implementation Plan	56
C. Evaluation Plan	56
D. Conditions Precedent and Covenants	58

LIST OF ANNEXES

- A. Government Application for Assistance
- B. Dames and Moore Geotechnical Report
- C. Socio-Cultural Considerations
- D. USAID Director's Certification
- E. Statutory Checklist
- F. Lenders' Supervision Report
- * G. Extracts from WBPSI Evaluation
- H. WBPSI Implementation Plan*
- I. Draft Project Description
- J. Draft Project Authorization

*These annexes are on file in ASIA/PD Office.

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT PAPER FACESHEET		1. TRANSACTION CODE A <small>A = ADD C = CHANGE D = DELETE</small>	PP 2. DOCUMENT CODE 3
3. COUNTRY ENTITY BANGLADESH		4. DOCUMENT REVISION NUMBER N/A	
5. PROJECT NUMBER (7 digits) 388-0024	5. BUREAU OFFICE A. SYMBOL ASIA B. CODE 04	7. PROJECT TITLE (Minimum 40 characters) Ashuganj Fertilizer Plant	
8. ESTIMATED FY OF PROJECT COMPLETION FY 81		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY 75 B. QUARTER 4 C. FINAL FY 78 Enter 1, 2, 3, or 4.	

10. ESTIMATED COSTS \$000 OR EQUIVALENT \$1 -						
A. FUNDING SOURCE	FY 78			LIFE OF PROJECT *(1)		
	B. FA	C. LC	D. TOTAL	E. FY	F. LC	G. TOTAL
AID APPROPRIATED TOTAL	22,000	1,000	23,000	52,000	1,000	53,000
GRANT						
LOAN	22,000	1,000	23,000	52,000	1,000	53,000
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY	2,000	73,000	75,000	4,000	179,000	183,000
OTHER DONORS:	67,000	2,000	69,000	178,000	2,000	180,000
TOTALS	91,000	76,000	167,000	234,000	182,000	416,000

11. PROPOSED BUDGET APPROPRIATED FUNDS \$000									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY 75		H. END FY 76		K. 3RD FY 77	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	130				30				
(2)									
(3)									
(4)									
TOTALS				30					

A. APPROPRIATION	N. 4TH FY 78		O. 5TH FY 79		LIFE OF PROJECT		12. NDCPT EVALUATION SCHEDULED MM YY 12 79
	P. GRANT	Q. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) FN		23				53	
(2)							
(3)							
(4)							
TOTALS		23				53	

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO
 2 = YES

(1) \$30.0 million loan approved in FY 75 LOP costs are FY 75 + FY 78 contributions.

14. ORIGINATING OFFICE CLEARANCE				15. DATE DOCUMENT RECEIVED IN AID W. OR FOR AID * DOCUMENTS DATE OF DISTRIBUTION			
SIGNATURE							
TITLE				DATE SIGNED			
Joseph S. Toner, Director				MM DD YY 88 01 6 20 78			

PART I.

A-1. Introduction

In FY 75 A.I.D. approved a Loan for \$30.0 million as part of a consortium of international lenders to supply a total of \$144.0 million for the estimated foreign exchange cost of constructing the Ashuganj Fertilizer complex in Bangladesh. The other international lenders included the Asian Development Bank, the International Development Association, the Ministry of Overseas Development (UK), the Government of Iran, the Federal Republic of Germany (KFW), and the Government of Switzerland. Based on current estimates the project is now expected to incur a foreign exchange cost overrun in excess of \$90 million. The consortium of lenders have agreed to share the cost overrun essentially on a pro-rated basis, with the exception of the Government of Iran, who will be providing a somewhat smaller contribution. A.I.D.'s pro-rata share of the cost overrun is \$23 million, and will be provided by the supplemental loan discussed herein.

An independent appraisal of the costs to complete the plant and revised construction schedules have been developed by the Williams Brothers Process Services, Inc. as consultant to the lenders. Supplemental technical assistance and new management arrangements are also being finalized in order to ensure the project will be completed in accordance with currently revised costs and schedules.

The economics of the project continue to be favorable and have been reexamined by IDA and reviewed by A.I.D. and the other lenders as discussed in the following paper.

Completion of the Ashuganj Fertilizer Plant continues to be a top priority undertaking of the A.I.D. Mission and is a necessary complimentary activity to the Fertilizer Distribution Project approved earlier this Fiscal Year. With completion of this plant in early 1981, Bangladesh will become self-sufficient in Urea production. Foreign exchange savings on fertilizer procurement approximate \$95.0 million per year at current prices.

PART I.

B. Recommendations

The following actions are being submitted for approval within the Project Paper:

Grant	\$
Loan	23,000,000
(Terms: 40 years, 10 year grace period, 2% during grace -- 3% there- after)	
Total	<u>\$23,000,000</u>

C. Description of the Project1. Borrower

The Borrower will be the Government of the People's Republic of Bangladesh. Overall responsibility for implementing the Project and administering the loan resources will be assigned by the Government to the Ashuganj Fertilizer and Chemical Company, Limited, a semi-autonomous government organization brought into being to be responsible for construction and operation of the Plant. Proceeds of the Loan will be relent to AFCC by the Government in accordance with the terms and conditions of the Financing Agreement.

2. Background and Rationale

The long range goal of this project is to improve the quality of life and nutritional intakes of the Bangladeshi people.

The more immediate sub-goal which this project relates to and supports is the increased production of foodgrains in Bangladesh, especially through the expanded use of fertilizer.

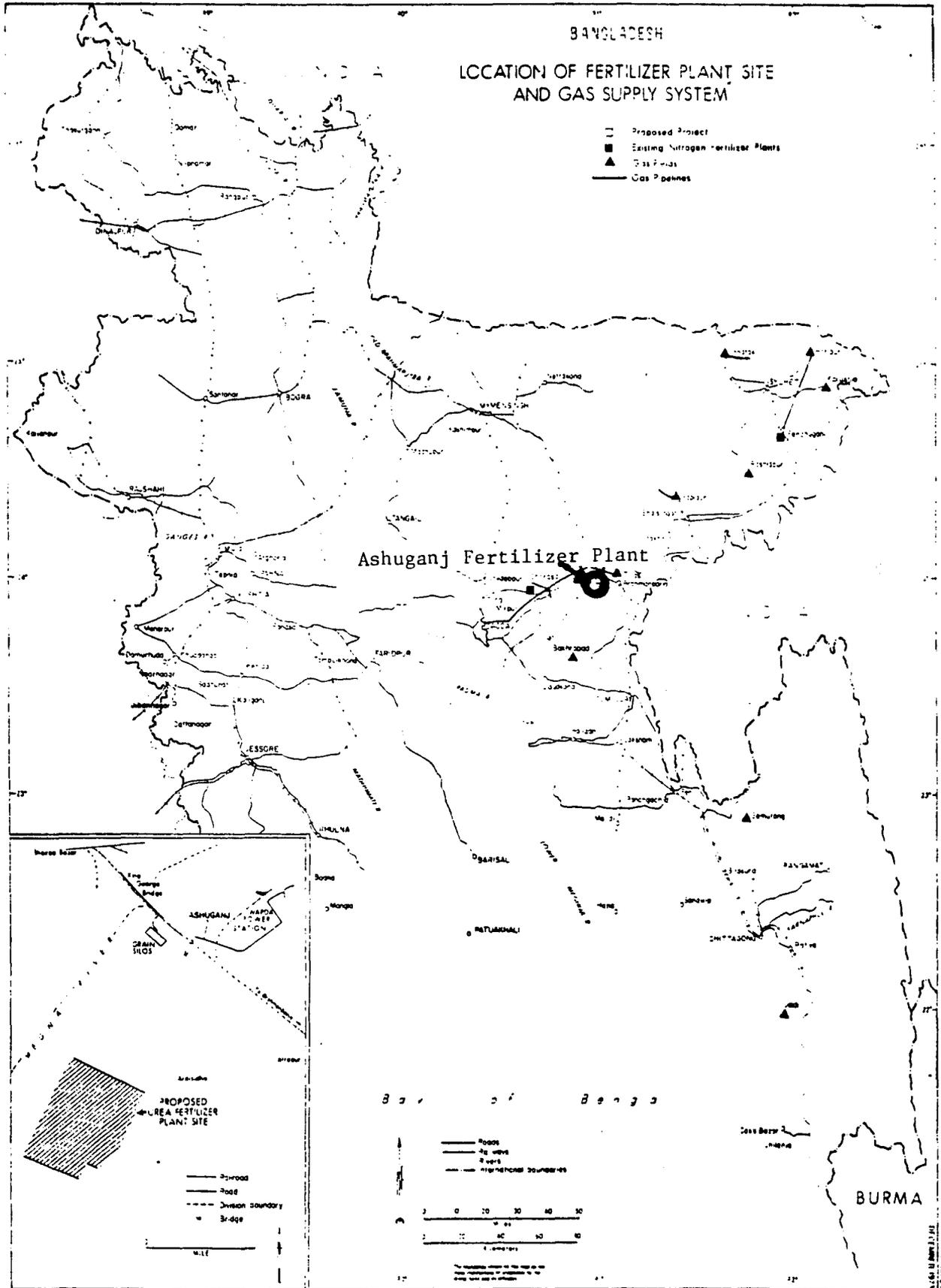
While the overall foodgrain production sub-sector remains influenced by a variety of complex resource constraints and mobilization issues, the basic formula for improving the productivity of Bangladeshi farmers in the short run must revolve around improving market linkages and the farmers' access to improved production inputs, especially fertilizer. Considerable progress has been made towards increasing fertilizer supplies and distribution during the past several years, but total consumption is still far below desired levels.

To support increased food production, USAID/Bangladesh, the Government and other Donors are embarking on a multi-year program to improve the supply and distribution of fertilizers to farmers throughout the country. This program will strive for major improvements in many aspects of the currently volatile input delivery mechanism, ranging from stabilization of fertilizer supply conditions, improving transport and warehousing, expanding marketing outlets and sales, improving systems management and forecasting, etc. To achieve the program goal regarding foodgrain production increases, fertilizer supplies must become reliable and move to within physical and financial reach of the farmers. Once this priority input constraint is improved upon (and assuming marketing linkages and production incentives are sustained), investment resources can be redirected to address complementary production equation deficiencies. For the short run however, the ratio of Bangladeshi land resources and number of people to be supported by the land remains in precarious balance. Improving the food production through the increased use of fertilizers has been selected as one of the higher-priority and technologically feasible means for avoiding a further deterioration in the people-land-food mix until other potential improvements in the equation can be implemented.

A critical ingredient in the Fertilizer Distribution Improvement Project (388-0024) is the increase and stabilization of fertilizer supplies from both internal and foreign sources. The in-country utilization of abundant natural gas resources as feedstocks to make nitrogenous fertilizers is recognized as a timely technical and economic contributor to improving the supplies of fertilizer needed by the Bangladesh farmers. As can be seen in Part III, in-country demand for urea is projected to rise to about 750,000 metric tons by 1982, with the Ashuganj Plant projected to supply approximately two-thirds of the country's requirements. (At a CIF cost of \$190/ton, the rated production of the Ashuganj Plant would be valued at approximately \$90 million per year). In addition to significant potential savings of foreign exchange resources, such production would be spread out over the year and thereby reduce somewhat the storage and transport problems generated by external fertilizer supplies. The successful start up and operation of the Plant will be an important supporting element of the overall Fertilizer Distribution Improvement Program and would enable the Ashuganj project to fulfill its intended purpose: To support an increase in food production specifically through the expansion of domestic manufacture of fertilizer in Bangladesh.

3. Project Description

The Ashuganj Fertilizer Plant project provides for the engineering, design, procurement, construction, commissioning and operation of an ammonia/urea fertilizer plant beside the Meghna River at Ashuganj, Comilla District in Bangladesh. The plant will have a rated capacity of 305,000 tons per year of ammonia and 528,000 tons per year of prilled urea based on a 330 day production year. The process will use natural gas from the nearby Titus gas fields for feedstock and fuel and will include its own steam driven turbogenerators for supply of process electric power requirements. The plant will have all necessary utilities and off-site support elements, such as water and effluent treatment facilities, process water cooling towers, ammonia storage and refrigeration, urea bag making and storage units, product handling and loading facilities, operation and maintenance shops, administration buildings, staff housing colony, etc. In addition to construction of the plant, the project provides for the training and development of the Ashuganj Fertilizer and Chemical Company Ltd. to operate and maintain the facility, including such technical, management and operations consulting services as are necessary to capacitate AFCC to carry out its project and operational responsibilities. AFCC will eventually have a staff of approximately 1200 employees. A map showing the location of the plant and a diagram of the ammonia/urea complex are provided below. The Ashuganj plant will be completed when the general contractor has certified that the plant has met its production performance tests and has produced urea at the rate of eighty percent (80%) of its rated capacity for a period of sixty consecutive days. The project purpose will be achieved when AFCC and its technical operations advisors are operating the plant at planned capacities and providing urea fertilizer to the Bangladesh organization (BADC) for distribution to the farmers.



SCALE 1:500,000

D. Project Status

Process engineering and procurement have progressed substantially and the project is entering the field civil works construction stage with a projected mechanical completion date of late 1980. Virtually all engineering and design is completed and is no longer considered a constraint to plant completion. The project was delayed while site foundation problems were decided upon and remedies initiated, but this delay is now passed and initial construction activities are beginning. Contracting arrangements for the critical compensatory foundation works have been finalized and the contractor is working at the site. Other civil works contracts are being readied for award. During the soil compaction phase, major process equipment manufacturing continued on schedule and is now projected to be ready well in advance of site installation needs. While storage and maintenance of these units will add some increase in overall cost, the equipment will be available for controlled shipments to site and mechanical erection schedules should benefit therefrom. A multitude of decisions are yet to be made and actions taken to fully gear up for plant construction and erection, but the capacity and responsiveness of AFCC, its supporting technical advisers and the Bangladesh Government seem to be moving in the direction of successful project management. More definite management and organizational improvements will be required as preconditions of supplementary financing contributions, but serious differences in these regards between AFCC, the BDG and the Lenders are not foreseen at the time. Competent expatriate project management expertise is currently being engaged by AFCC to ensure that the project gets a revised implementation plan, gets on track and stays there until mechanical completion, testing and successful start-up.

1. Project Schedule

The currently estimated plant mechanical completion date of December, 1980 is approximately two years beyond the schedule envisioned at the time of original project appraisal. This cumulative delay period is the result of a combination of deficiencies, but can generally be broken into three elements. Approximately 15% of the overall delay was due to Lender-BDG difficulties in getting the project organized, staffed and working in the first instance. An estimated 20% could be attributed to inadequate management talent, coordination and supervision between the expatriate advisers, the project

engineer group, AFCC and the management assistance firm. These deficiencies were magnified by the physical separation of parties and the problems encountered in trying to implement this kind of project in a remote area. The remaining portion of overall delays can be generally attributed to shortcomings between the Lenders and the BDG in reaching an early agreement on the technical scope and resolution of site foundation problems and the eleven months needed by the contractor to carry out the dynamic compaction work.

Notwithstanding these delays and the cost increase which resulted therefrom (including inflation, changes in the project scope and currency movements), measures are being outlined which will bring project management expertise to AFCC and with it, better adherence to plans and schedules. A delayed start up of a plant of this size traditionally brings with it potential changes in project economics and increases in capital costs. However, with the new schedules being evaluated and the donors' insistence upon the addition of empowered and qualified project management expertise, both time and cost should come under satisfactory control. The projected plant start up date is now estimated to be March, 1981. Contingency planning estimates this start up prior to June, 1981.

2. Financing Requirements

As a result of foundation problems, currency rate changes, modifications in the project scope and general implementation delays, both foreign exchange and local currency requirements of the project have risen. The revised cost estimate, prepared by WBI as part of its evaluation indicates that the financing needs of the project will rise to approximately \$234.0 million in foreign exchange and \$182.0 million equivalent local currency (@ 15 Taka = U.S. dollar). To make up the shortfall over existing project financing, the donors and the BDG will have to contribute an additional \$91.8 million equivalent in foreign exchange and \$74.9 million equivalent in local currency. On the basis of the lenders' previous agreement to accommodate supplementary Ashuganj financing needs on a pro-rata basis, A.I.D.'s share will amount to approximately \$23.0 million. Except for approximately \$2 million in A.I.D. funds reserved for financing one of the construction contracts now out for bid,

virtually all available project funds have been committed to date. Serious accounts deficits have been forecast by Foster Wheeler for all of the lenders and possible delays and cost increases if additional funds are not made available quickly. In addition, some donors' financing is denominated in the dollar equivalents of other currencies, so shortfalls could occur if currency exchange rates continue to deteriorate. Because of new procurement scheduled for advertisement and awards, A.I.D. funds must be available for Foster Wheeler use by early August, 1978. Additional details on supplementary financing requirements are contained in Part III and Annex G.

3. Management Improvements

In the past AFCC and its technical and management advisers have been poorly organized and inadequately staffed to supervise and implement the project in an effective manner. As a result, much of Foster Wheeler's engineering, procurement and construction inputs were left unsupervised or diluted with the end result that project schedules and costs slipped beyond desirable controls. However, as a result of improved Bangladesh Government interest in project operations and insight gained from the WBI evaluation, several improvements are being accepted and implemented. AFCC responsibilities for overseeing and supporting FWL activities and monitoring construction inputs has come into sharper focus as well as its responsibility for making the correct decisions in a timely fashion.

To help address these shortcomings in the future, the BDG agreed to implement some organizational reforms, obtain better qualified people and change the role of the present management assistance firm to get a substitute group specifically experienced in project management. Discussions have already taken place between AFCC, the Government and WBI regarding WBI's assumption of responsibility for project management. A letter of intent to secure the initial personnel on a priority basis has already been issued to WBI by AFCC. In addition, increased decision making authorities have been delegated to AFCC personnel and AFCC's Board of Directors was reconstituted to include senior Government officials more familiar with the Project's needs, receptive to expatriate assistance and to recommendations by lenders. Mr. Matiul Islam, Secretary (Industries), is now the Chairman of the Board. Mr. Muhith, Secretary (Planning), Mr. Jamaluddin, Secretary (Finance) and Mr. Al Hussaini, Member (Planning Commission) are the other part-time Directors. Considerations are also being given to modifying the remaining role of the management assistance firm to arrive at a suitable mechanism

for getting AFCC capacitated for operating and managing the plant once commissioning is complete. An adequate operating capacity must be installed to run the plant successfully in order to meet the overall purpose of the project.

4. Summary Evaluation of Project Status

The project is currently making considerable progress due to the resolution of previous technical difficulties with the foundation and increased management attention by all parties involved. All problems are certainly not resolved as yet, but the project is better off now than at any time during the past two years. This condition is largely due to improved communications between the lenders, the Government and the Company and a visible desire on the part of all to coordinate efforts towards a common objective of getting the plant completed within the limits of the revised budget and implementation schedules. There are reasonable prospects for further progress and improvements since positive steps have already been taken by the Government and AFCC regarding additional project management assistance. An extensive and professional evaluation has just been completed of the entire project by the Williams Brothers Process Services Company and problem areas and solutions to these problems are defined. If implemented promptly, the project should move deliberately and successfully towards completion and achievement of purpose. It will now be up to the lenders and the Government to come up with the supplementary resources needed to finance these solutions.

E. Issues and Discussion Points

The following issues have been raised with respect to this supplementary financing request. Comments are provided as to their expected impact on project implementation and the realization of project objectives.

1. Project Management Deficiencies

Conclusions of the donors' joint project supervision missions in December, 1977 and March, 1978 and the results of the WBPSI evaluation confirmed that management resources were inadequate to implement the project and AFCC had little capacity for productive supervision, decision-making and providing leadership when project consultants or agreements presented shortcomings. Lack of timely and effective decision-making and failure to supervise the interrelated and often overlapping duties and responsibilities of project participants contributed in some ways towards schedule delays and cost increases. The donors were possibly negligent in not recognizing earlier that scopes of work were somewhat beyond the capacity of certain participants and that operational authorities were not structured so as to ensure decisive and effective project implementation. The issue is therefore appropriately raised as to whether adequate management resources will be positively made available and so applied as to get the plant completed by the time now projected and with the cost allowances of the revised project budget.

This issue has been discussed among the donors and raised directly with the Government and AFCC. Several donors have indicated that the provision of supplementary financing resources are contingent upon the Government and AFCC resolving deficiencies now existing between project participants and entering into contract(s) with a firm or individuals to provide the additional project management and/or operations training resources needed. AFCC and the Government have seemingly accepted the need for improving project management and have taken a number of steps to realign consultants' scopes of work and responsibilities and thereby prepare the way for the prompt insertion of improved project management expertise. In addition, the Government has asked for Lenders' concurrence and is entering into preliminary discussions with the Williams Brothers Process Services, Inc. to obtain this management expertise. In recognition of the considerable progress made to date on this matter, the Lenders are confident

that AFCC will overcome this present project deficiency before final lender approvals are sought from their respective boards on the supplementary financing requests. We consider improved project management to be essential to the achievement of the project purpose to get the plant constructed and commissioned and AFCC trained and equipped to operate it properly. We are satisfied that the Government and AFCC are currently pursuing a rational solution to the problem and are confident that they will be successful in this regard. Notwithstanding, the issue of adequate project management is real and we have therefore incorporated the satisfactory resolution of this problem into the proposed Conditions Precedent to Disbursement. We feel that this mechanism will give the Government and AFCC adequate freedom and the proper incentive to work out the details of a solution, but still leave AID with control over timely implementation of such actions.

2. Sharing of the Supplementary Financing Burden

As discussed earlier in the PRP, the supplementary financing request raises a policy issue as to whether AID should contribute additional financing to the project since there is a provision in the standard AID loan agreement that indicates such shortfalls should be the responsibility of the Host country as the Borrower. This matter of supplementary financing was raised during initial project negotiations in 1976 and a memorandum prepared recording the inclinations of the lenders made at the time that supplementary project resources would be made available on a pro rata basis by the donors. This agreement was reached in principle because each donor was aware, owing initially to site foundation problems, that additional financing resources would be needed to complete the project. Only conceptual commitments among the donors could be made at the time because it was recognized that the time delays and cost implications of same would have to await preparation of a revised and accurate project budget and start-up schedule. Now that the site foundation problems are resolved and the area released for construction, the remaining schedule has been evaluated and a new forecast budget prepared. The lenders (excepting Iran, who was represented by IDA) reviewed this new schedule and budget with WBPSI in Washington in mid-May. The total budgetary requirements were discussed and the lenders reviewed the activities which were allocated to each for supplementary financing responsibility. It was the general consensus that the overall budget figures were complete and reasonable given present assumptions and the uncertainties in Bangladesh and the fact that a great multitude of activities remain to be successfully accomplished before the plant will be completed, commissioned and launched into full operations. Each representative agreed to return to his management and, on the basis that the project was vital to Bangladesh,

still economic at the revised schedule and cost and within the realm of the possible, recommend that the prior agreement be implemented to each assume a proportionate share of the supplementary financing requirements of the project.

The agreed upon conditions of the prior memorandum were that the donors would assume the supplementary financing burden if the Government was not at fault in causing such a financing shortfall and that the Bangladesh Government foreign exchange reserves were not in position at the time to absorb such financing requirements. As reported in the PRP, the history is clear that the foundation problem did generate substantial delays and cost increases and was not the fault of the BDG. It could be said that some time passed before a satisfactory solution was reached between the Government and the donors, but this was in large part due to the technical complexity of foundation condition and difficulties in arriving at an economic decision and not the singular fault of the BDG. The Government will have to absorb approximately \$74.9 million equivalent in additional local currency cost increases anyway and this by itself is a sufficient burden and measure of commitment. The donors have accepted that the Government is not in a position to contribute foreign exchange to the project and would best make its contribution through the timely provision of local currency resources (which it has already agreed to do).

As an adjunct to the supplementary financing question, the point has been raised as to whether it is appropriate for A.I.D. to make its supplementary financing contribution in the form of a loan or with grant financing since Bangladesh has been designated as an LDC and deserving of grant assistance. It is concluded that this is more of an academic point at this time since the project badly needs the additional financing now and few grant funds remain available within the Agency for FY 78. If A.I.D. were to wait for FY 79 grant financing, additional delays and cost increases would result because critical construction services contracts need additional A.I.D. financing commitments several months before the new FY 79 funds would be available to the project. Financing of these contracts cannot practically be shifted to other donors because of the limitations on budget categories and source/origin problems. If there were delays due to late A.I.D. contributions, A.I.D. and Bangladesh would be accorded additional future penalties for delayed project start up because A.I.D. is also projected to finance fertilizer imports because of the lack of in-country fertilizer.

manufacturing capacity. In view of the requirements of the project, the committee recommends that FY 78 loan funds be applied since available funding is far more critical than the minor differences between grant assistance and long term loan funds. The provision of loan financing will also be consistent with the financial mechanisms already functioning smoothly for the project.

F. Summary Findings

The Project Committee has reviewed the technical, economic and financial aspects of the project. On the basis of an indepth evaluation of project management and implementation progress by the Williams Brothers Process Services Company and the combined efforts of the Government and AFCC to assert better control over project activities, the Mission is satisfied that resources will be applied to get the plant completed at reasonable cost and the earliest practicable date. While overall project costs and financial requirements have risen and the completion date moved to March, 1981, the project is still economic and is easily justified in view of its potential contributions towards improving much needed fertilizer supplies in Bangladesh. With the recent commitments by the Donor group on providing the additional foreign exchange financing needed to complete the project, the Mission is confident that implementation activities will continue to progress into the condition of adequate and stable control and a successful completion, commissioning and start up of the plant is expected.

Part II. DISCUSSION OF PROJECT ELEMENTS

A. Project Site Problem

The Project site problem has been a major factor seriously affecting the project completion schedule and, as a result, project costs. The Project site, which would otherwise have been available for the start of construction by July 1976, was accepted for construction after dynamic compaction 20 months later, in March 1978. In addition to dynamic compaction, compensatory foundations have been required for some of the plant's critical structures, requiring additional construction time and investments. The following sections review the background to the problem and the development of a solution to the site problem.

Background

The Project site at Ashuganj was originally selected in 1969 by the Bangladesh Fertilizers Chemicals, and Pharmaceuticals Corporation (BFCPC) for the location of a petrochemical complex after evaluation of several alternative locations. About 536 acres had been acquired and was available with BFCPC, when it was decided in 1973 to locate only a fertilizer project in the first phase and 194 acres of land was allocated to the Project. The Bank appraisal of the Project in late 1974 was based on its location at Ashuganj. As the land was low-lying, it was recognized that the site would require about 18 feet of filling with sands dredged from the bed of the Meghna river which surrounds the island site and 25 feet of filling at the housing area to bring them to 5 feet above maximum flood levels. A local consultant engineering firm carried out preliminary soil investigations in early 1974 and prepared the bid documents for the dredging and earth filling work. While noting that the area was seismic, detailed investigation of the impact of any seismic activity at site was postponed until the site had been dredged and filled. The filling work was completed on schedule in January 1976. To develop necessary soil data for foundation designs, the Engineering Firm retained soils consultants in April 1976 to carry out further studies on the soil conditions of the filled site. The consultants were required to assess the seismic characteristics of the area and the earthquake zone intensity factor.

An IDA supervision mission was informed in August 1976 that preliminary studies indicated liquefaction susceptibilities of the upper and lower silts which would be initiated by seismic activity. Dynamic compaction of the site soils could reduce the liquefaction risk. They did note however that remedial measures would delay the project and increase costs. At joint Government-lender meetings in early November 1976, the findings were discussed. The consultants indicated that project structures would need to be designed for earthquake factor of 0.25g. to keep the risk of damage to plant structures in the event of an earthquake below 20%. The consultants also considered the fill to a depth of 20 meters as liquefiable at maximum surface accelerations exceeding 0.16 g. For the denser silty sands between about 20 m and 25 m below the surface, the critical acceleration was assessed at about 0.2 g. The studies also showed possible slope failure or lateral spreading of the island site if excess pore-water pressures were to develop or if liquefaction were to occur. While the site was likely to be stable at maximum surface acceleration below 0.1 g., the probability of instability was expected to increase leading to virtual certainty of instability at an acceleration exceeding 0.2g. Based on the above findings, the consultants recommended (a) compaction of the site soils to 20 meters depth (b) vertical drainage blankets through the compacted sand and upper silt layer for the important structures (c) piling for important structures and (d) fully compensated foundations for certain large and heavily loaded structures. The consultants did not see any reasonable preventive measures against instability leading possibly to a flow slide. According to estimates made by the Engineering Firm, the recommended remedial measures would cost U.S. \$19 million and extend project completion by 13 months. The compaction time would also produce secondary cost increases as a result of delays.

The Government, assisted by its own experts, questioned the consultants' assessment of maximum surface acceleration and likely damage to structures based on historical experience in the region. In view of conflicting opinions as to the likelihood of earthquakes in the area and damage that would result, the lenders decided to (a) have the site problem reviewed on their behalf by a firm experienced in earthquake engineering, and (b) study the economics of moving the project to an alternative site.

These fresh seismic risk studies produced recommendations for a design for plant structures to withstand ground accelerations of 0.15 g. They assumed an exceedance probability of 10 percent during a plant life of 25 years. The liquefaction studies showed the need for densification of the top 10 m for a design acceleration of 0.15 g., in the primary and secondary process structure areas. In addition, the consultants recommended densification to 20 meters depth and compensated foundations for the heavily loaded structures in the primary and secondary process areas to reduce differential settlements. The consultants did not consider that site instability could be a problem since the lower silts have a factor of safety against liquefaction exceeding 2 for ground accelerations of 0.15g. Summarizing, they stated that while seismic hazards at the site were significant, the associated design accelerations did not render the site economically or structurally unsuitable.

Evaluation by IDA of 14 alternative sites for which adequate details were available indicated Ghorasal (where spare ground was identified) as the most suitable alternative location to Ashuganj, based primarily on the lead time for land acquisition that would have been necessary for another site. The evaluation showed that a decision to shift the Project to Ghorasal would involve a further delay of three months and a further increase in Project cost by about U.S. \$3 million. Given these costs and that remedial measures could be taken at Ashuganj, the summary conclusions did not recommend moving the location away from Ashuganj. The project lenders concurred.

On the basis of both the soils consultants' and the earthquake engineers' findings, the following site preparation measures were recommended by the Engineering Firm: (a) dynamic compaction to 20m depth in the primary and secondary process areas, (b) dynamic compaction to 10m depth in the ancillary building area, (c) vertical drains to 12m depth under structures in (b) and (c) above, and (d) compensated foundations for large, heavily loaded important structures. A subsequent Government-lenders meeting was held in London during February 1977 to discuss these recommendations. The Government agreed that the Ashuganj site should be retained. However, an immediate decision on an adequate site preparation scheme was not forthcoming. The Government felt that any decision on the site issue would have implications not merely

for the economics of the project but also for its own building codes and hence future industrial investment costs. It was therefore reluctant to make a decision until it could be shown that the risks identified and remedial measures proposed were considered a unique requirement of the filled island site at Ashuganj. Agreement between the Government and the Lenders on the additional site preparation needs, i.e. dynamic soil compaction, was reached in May 1977. A U.S. \$5.5 million contract for dynamic compaction, which was to take 10 months to execute was signed in May, 1977. The compaction work was completed in March 1978 and the site turned over to Foster Wheeler for plant civil works construction.

B. Compensatory Foundations and Subcontracts

Four out of 49 prequalified firms expressed interest in the subcontract for (i) compensatory foundations for the prill tower, urea structure and ammonia storage tank, and (ii) the construction of the prill tower and of the urea structure. The bids were opened on January 4, 1978. To expedite the review and approval of this time-critical subcontract AFCC and the lenders sent representatives to FWL's Reading headquarters from January 23-26. As a result, a contract was signed on January 26 between AFCC and Korea Development Corporation for construction of the works at an estimated value of US\$7,555,000, including a local currency component of US\$2,269,000 equivalent. This compares favorably to budgeted amounts of US\$8,800,000 and US\$2,900,000 respectively. The contractor will also supply cement at an additional cost of US\$750,000, including a local currency component of US\$100,000. This represents a major concession on the part of the Government and AFCC who had earlier maintained their intention to rely largely on local cement supply despite persistent country-wide shortages. The contract became effective on March 1, 1978 and provides for completion by November 1979.

In addition to the above, which is the major construction subcontract, there are numerous construction services which FWL will subcontract out. The scope of such subcontracting was a matter of controversy between FWL and AFCC for quite some time, but good progress has been made since April. AFCC agreed that it would not object to FWL

using local subcontracting, i.e., to local contractors using Bangladeshi labor. Local subcontracts for temporary buildings, stores, boundary walls and similar facilities have in effect been awarded, and the work is proceeding. AFCC has also agreed to the international subcontracting for the time-critical jetty piling and construction, including the raw water intake system, for part of the instrumentation work, and for non-destructive testing work. Discussions on the scope of international subcontracting for the following services are continuing:

- (i) erection of urea bulk storage portal frames and their cladding with aluminium sheeting
- (ii) Installation of heater refractories
- (iii) installation of solids handling system
- (iv) erection of reformer furnace and waste heat boiler
- (v) pipefitting and welding
- (vi) electrical work
- (vii) part of instrumentation work
- (viii) thermal insulation
- (ix) design and installation of central air conditioning system
- (x) installation and testing of communications equipment

D. Construction Labor Supplies

Training of Bangladeshi construction craft labor began in January 1978. Foster Wheeler will have to train several hundred personnel in such skills as advanced carpentry, welding, pipe fitting, structural assembly, electrical wiring, etc. Between projected training rates and the adjusted approach to perform a number of functions through local or international subcontractors, Foster Wheeler is expected to be able to complete construction and erection activities on schedule. However, there are several potential problems which may prove beyond the control of AFCC or FWL. The most serious problem is the increasing emigration of skilled Bangladeshi labor to middle eastern countries. The training

program is designed to upgrade semi-skilled labor to the craftsman level within a certain time-period. Embodied in this approach is the assumption that semi-skilled personnel are available and will be attracted and retained by the wage rates provided by AFCC. This has generally been the case, but large quantities of trainees are yet to be hired and semi-skilled labor is being attracted by the wealthier Moslem countries. The wage rates and import incentives being given to skilled labor that go to the middle east pose a serious threat to FWL's efforts to hire, train and retain sufficient numbers of local personnel to do the job. If the competition becomes too severe, skilled expatriate labor may have to be imported to keep the project on schedule. This potential problem will be closely monitored.

E. Procurement and Logistics

1. Status of Procurement

Compared to the construction activities, the procurement activities for the main equipment units are to a large extent complete and have generally not been critical. On the contrary, one of the major problems is caused by the later than expected start of construction (due mostly to the soil compaction) because of which most equipment units will have to be kept on vendor's premises up to the last quart of 1978, thus incurring storage charges estimated by FWL at US\$4.2 million and by AFCC as US\$4.5 million. The only major equipment unit whose late ordering has been a cause of concern is the second turbogenerator. Although the decision in principle to purchase a second unit was taken as early as September 1977, the purchase order had not yet been placed by the time the Lenders visited Bangladesh in December 1977, reportedly due to questions raised by AFCC's Board regarding what appears to be a small difference between the price quoted by the Swiss supplier for the first and the second unit. The Lenders' Aide Memoire submitted to the Government in December 1977 specified that a purchase order be placed prior to January 15, 1978, and this has now been achieved (Annex F).

Although most of the major equipment items have been ordered and are in process of manufacture, many smaller and ancillary items are not yet under order. Some of these smaller items are time critical (e.g., construction equipment, vehicles, small tools, etc.). Even where orders have been placed, equipment and materials

deliveries are a potential problem because many suppliers are having difficulties with their supporting letters of credit. This problem has been resolved for A.I.D.-financed purchases but remains of concern for other lender-financed goods. WBPSI will provide a logistics controller to minimize problems of this nature. The problems with letters of credit have been discussed between AFCC, FWL, AID and IDA and solutions are forthcoming. The approval authority of the AFCC representative in Reading has been raised to US\$200,000 which will help reduce the management time spent by AFCC on minor procurement issues while major issues receive insufficient attention.

The procurement history for local materials and labor support has not revealed any major problems to date except for critical items such as cement. However, as the Project moves into the heavy construction phase, this kind of procurement activity will pick up significantly, and it is essential that AFCC's procurement system be reviewed to make sure that it can accommodate this increased load without causing delays. The Project Management Consulting Team will provide AFCC with expertise in this area. The timely availability of local currency is a matter of importance and cash demand schedules are being prepared by WBPSI to avoid delays in the procurement of local materials.

2. Logistics Management

Local and external logistics management has not yet been tested since the bulk of process equipment shipments has been postponed. Despite this, several caution signals have gone up regarding the system that will marshal, ship, clear in-country, move to the site and receive, inspect and warehouse goods until needed for construction/erection. The first caution signal has come in the area of shipping controls and clearance through customs upon arrival. A simple, well-organized system of movement control and payments to shippers is being set up and a blanket import license obtained for the project. FWL should have complete authority, including payment capacity, to move goods to the Project site by the most expeditious means necessary; to help achieve this, IDA has opened letters of credit to five shipping agents to cover prompt payments to shippers. AFCC and FWL are completing development of procedures and mechanisms for customs clearance and inland transport. Logistics management, including inland transport, site storage, and who will be responsible for receipt, inspection

and warehousing until released for erection, is being given priority attention by WBPSI, and a logistics plan and system are being recommended by the Management Consulting Team.

F. Training and Preparation for Operations

In August 1977, AFCC presented the lenders with an overall training program for AFCC inclusive of overseas training as a major element based on a report prepared by FWL. This program showed some 60 maintenance, 75 production and 10 management and services personnel to receive about 3,600 man-weeks of overseas training at a foreign exchange cost of US\$1.8 million against US\$1.0 million estimated at appraisal. In line with representations by IDA that the overseas component of this program was considerably larger than in similar projects known to the Bank, the Government reduced at least the program for operating personnel by about half. Furthermore, IDA asked AFCC to consider doing a larger part of the in-country training at the Ghorasal plant rather than in Fenchuganj (which uses a different process) and to approach the Bank-financed PUSRI Fertilizer Company in Indonesia to reduce the foreign exchange cost of travel for overseas training. Progress is being made on the last two points, and AFCC and PUSRI are presently discussing ways to limit the cost of training in Indonesia to a minimum. Training of maintenance personnel, which is being done on vendors' premises, has already started and 35 trainees are presently abroad. FWL is also providing training facilities for some 70 AFCC permanent staff at the Bangladesh/German technical school.

PART III. TECHNICAL ANALYSES

A. Review of Fertilizer Requirements

Agriculture dominates the Bangladesh economy, contributing more than 55% to GDP and employing over 75% of the labor force. The sector's interaction with the rest of the economy is crucial to the pace and direction of economic development. It is a primary determinant of foreign exchange earnings through export of cash crops (jute and jute textiles). The size of the rice crop determines the need for foodgrain imports. In 1975/76, due, inter alia, to favorable weather conditions and higher food prices in 1974/75, foodgrain production surpassed previous levels by some 10%. Nevertheless, Bangladesh still had to import about 1.4 million tons of foodgrains in 1975/76. Faced with constraints on the expansion of arable land and rapid population growth, Bangladesh's agricultural strategy rests on a more intensive agriculture with higher yields and cropping intensities. The wider use of high yielding seed varieties, combined with expanded irrigation services and increased fertilizer application is therefore central for the country if it is to reduce its reliance in food imports and expand the output of cash crops. Shortfalls in fertilizer supply, whether imported or domestically produced, would be detrimental to the entire economy.

Total fertilizer demand has been increasing steadily since 1972/73, rising from 375 tons in that year to an estimated 600,000 in 1977/78. 1/ The strong demand in 1977/78, which represented an increase of about 20% over the previous year, resulted from the following:

- (i) fertilizer prices remained unchanged from the previous year; 2/
- (ii) the procurement price for paddy had been raised before planting;
- (iii) increased efforts by the Government to promote fertilizer, specifically through distributing markets, liberalizing credit and simplifying sales procedures.

1/ By February 1978 offtakes were about 640,000 tons.

2/ Since July 1976

	<u>TK/Md</u>		
	<u>Urea</u>	<u>TSP</u>	<u>MP</u>
	60	48	40

The Bangladesh Agricultural Development Corporation, a public sector organization, procures and distributes nearly all the 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 by the Thana Central Cooperative Association which acts as a wholesale agent for its member village cooperatives or private retail agents. This system, despite the difficulties of transportation in Bangladesh, has in most years proved sufficiently flexible to handle the substantial increase in fertilizer use and has resulted in deliveries to nearly every village. While BADC performance has been commendable, many improvements are needed to reduce storage problems, increase system capacities to support greater offtakes and improve the timing of various fertilizers available for sale at the local level. USAID/Dacca is working closely with the Government on this problem and has just begun a long-range Fertilizer Distribution Improvement Program (#0038) into which the Ashuganj production will be absorbed. Details of this program and the Bangladesh agricultural sector are contained in that project paper. The following tables summarize the actual and projected demands for fertilizers in Bangladesh and expected in-country production levels.

Table 1

Actual Fertilizer Offtakes from BADC
(Thousands of Long Tons)

<u>Year</u>	<u>Urea</u>	<u>TSP</u>	<u>MP</u>	<u>AS*</u>	<u>SP</u>	<u>HP</u>	<u>NPK</u>	<u>Total</u>
1962-63	41	3	2	25	3	-	-	74
1963-64	75	23	4	8	2	-	-	112
1964-65	71	19	4	7	-	-	-	101
1965-66	83	20	4	21	-	-	-	128
1966-67	121	35	8	6	-	-	-	170
1967-68	152	48	11	15	-	-	-	226
1968-69	160	53	12	12	-	-	-	237
1969-70	196	66	15	14	-	-	-	291
1970-71	212	76	18	-	-	-	-	306
1971-72	170	50	14	-	-	-	-	244
1972-73	277	89	18	-	-	-	-	384
1973-74	268	94	18	-	-	-	-	380
1974-75	176	76	18	-	-	14	1	282
1975-76	312	111	22	-	2	4	7	458
1976-77	349	124	22	-	2	4	6	507
Jul-Dec 77	205	102	20	-	0.5	2	0.5	330
Jan-Mar 78	139	44	12	-	0.4	0.	0.2	196

*Since 1970-71 Ammonia Sulphate Sales have been direct from the Fenchuganj Factory or through other separate import arrangements for the tea gardens.

Table 2

Actual Local Fertilizer Production
(Thousands of Long Tons)

<u>Year</u>	<u>Fenchuganj</u>		<u>Ghorasal</u>	<u>Chittagong</u>
	<u>Urea</u>	<u>AS</u>	<u>Urea</u>	<u>TSP</u>
1962-63	72	-	-	-
1963-64	100	-	-	-
1964-65	76	-	-	-
1975-66	91	-	-	-
1966-67	94	-	-	-
1967-68	109	-	-	-
1968-69	87	-	-	-
1969-70	94	5	-	-
1970-71	55	6	44	-
1971-72	46	3	-	-
1972-73	39	6	172	-
1973-74	60	10	218	-
1974-75	58	5	11	30
1975-76	52	6	225	48
1976-77	77	9	208	46
Jul-Mar, 78	45	6	137	31
Capacity (330 days operation)	107	11	335	150
Average Operating Rate	73 68%	6 55%	214 (4.5 yrs) 63%	40 27%

Table 3
 USAID Projected Fertilizer Offtakes
 (000's Long Tons)

<u>Year</u>	<u>Urea</u>	<u>TSP</u>	<u>MP</u>	<u>Total</u>
1977-78	452	173	40	665
1978-79	520	199	45	764
1979-80	598	229	51	878
1980-81	687	263	60	1010
1981-82	790	302	69	1161
1982-83	908	347	80	1335

Total offtakes for 1977-78 are estimated based on actual sales for July 1977-March 1978 plus BADC targets for April-June 1978. Total offtakes 1978-79 to 1982-83 are projected on the basis of 15 percent annual increases from the 1977-78 total. Urea, TSP, and MP offtakes are projected at 68, 26, and 6 percent of the total offtakes respectively as is presently the case.

Table 4

Urea Fertilizer Production and Demand Projections

<u>Year</u>	<u>Production</u> ^{1/}	<u>Demand</u> ^{2/}	<u>Projected Shortfall</u>	<u>Shortfall w/o Ashuganj Production</u>
1975/76	278,000	312,000	34,000	34,000
1976/77	285,000	349,000	64,000	64,000
1977/78	290,000	425,000	135,000	135,000
1978/79	300,000	482,000	182,000	182,000
1979/80	300,000	548,000	248,000	248,000
1980/81	440,000	625,000	185,000	325,000
1981/82	700,000	715,000	15,000	415,000
1982/83	775,000	810,000	35,000	510,000
1983/84	780,000	855,000	75,000	555,000
1984/85	780,000	900,000	120,000	600,000

1/ Production start-up of Ashuganj plant estimated at 75%, 85% and 90% thereafter.

2/ Based on averaging "Ashuganj Study" projections and USAID 1978 estimates.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

FINANCIAL AND ECONOMIC REAPPRAISAL*

B. Financial Analysis

1. Revised projected income statements, balance sheets and funds flow statements for AFCC have been prepared (Tables 1, 2 and 3 attached to this section and are summarized below:

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Capacity Utilization %	30.0	50.0	65.0	75.0	80.0	80.0	80.0
	- - - - - US\$ million - - - - -						
Sales Revenues	30.1	56.4	81.8	106.6	127.4	144.1	161.8
Total Production Costs	44.8	49.6	53.9	57.6	60.4	63.3	64.3
Interest Expense	13.5	22.8	21.0	18.7	16.4	14.0	11.7
Before Tax Income <u>a/</u>	(28.2)	(16.0)	6.9	30.3	50.7	67.8	85.9
After Tax Income <u>b/</u>	(28.2)	(16.0)	6.9	30.3	22.8	30.5	38.6

Ratios:

Quick Ratio	0.4	0.3	0.8	2.3	3.5	5.1	6.9
Current Ratio	0.7	0.6	1.2	2.7	3.9	5.5	7.4
Debt Service Coverage Ratio	1.1	1.1	1.3	1.9	1.7	2.0	2.3
Debt/Equity Ratio (%)	61/39	61/39	57/43	48/52	41/59	33/67	24/76
Break-even as % of Cap. Util.	64.5	67.2	58.4	49.8	42.8	36.4	31.3
After Tax Income/Sales (%)	(93.8)	(28.4)	8.5	28.4	17.9	21.2	23.9

a/ 9 months at 40% utilization rate

b/ No income tax assumed to be paid until cumulative income becomes positive

2. These projections were based on the following major assumptions: (i) the final revised capital cost estimate (Annex IV) was used and a revised disbursement pattern, estimated by AFCC, was applied to it; (ii) 1/ operating costs were recalculated according to the latest available input price data, 1/ and escalated to 1981, the first operating year; (iii) a 6% 2/ annual escalation rate was applied to both revenues and operating costs; 2/ and (iv) lower operating rates than those assumed at appraisal were used, i.e. 40% in the first year of operations, 50% in the second, 65% in the third, 75% in the fourth, and 80% thereafter. The Appraisal Report had assumed a three-year 50-75-90% buildup. The above reduction in the operating rates and slower buildup was deemed necessary to reflect the very likely problems of quantity and quality of skilled operating personnel which the project might experience after startup in view of the unprecedented drain of skilled Bangladeshi labour to the Middle-East. The ex-factory price which had been assumed in the Appraisal Report and agreed at that time with the Government was \$155 per ton at 1978 prices, which corresponds roughly to \$190 at 1981 prices.

* Extracts from IBRD Project Appraisal Report, 6/76.

1/ base gas price (1978) is \$ 0.4 per 1,000 cubic feet

2/ no escalation of cost/revenues after startup had been assumed in the Appraisal Report

The rationale for retaining this price was that it was the minimum price required to assure at all times a debt service coverage of 1.5 or better on the foreign exchange resources provided by the Lenders and onlent by the Government to AFCC at a 10%^{1/} interest rate and with a repayment of 15 years including 5 years of grace. ^{2/} Since this price level^{2/} corresponds approximatively to the international FOB urea price projected for 1981^{2/}, it was judged desirable to retain the same base price of \$190 per ton at 1981 prices for the purpose of the revised financial projections.

3. The following departures from arrangements and covenants agreed at the time of appraisal are however necessary due to the fact that this essentially unchanged price level is now combined with a longer project schedule, higher capital costs and lower operating rates than estimated at appraisal: (i) the date of first repayment by AFCC to the Government on the loan funds provided by the Lenders and onlent by the Government should be postponed by two and a half years to the second part of 1982, in line with the delay experienced by the Project; (ii) AFCC should be relieved from having to attain a debt service coverage ratio and a current ratio of 1.5 or better for the first three years of operations; and (iii) a tax holiday should be granted to AFCC in the form of a relief from income tax payments until AFCC breaks even on a cumulative basis. These points have already been taken into account in the revised projections summarized above, and will be discussed with the Government and AFCC during negotiations, along with the need for general assurances from the Government that if required, it will take appropriate steps including debt rescheduling, to insure both that AFCC will remain financially viable and that the price of urea to the consumer will remain attractive enough to assure a full offtake.

4. Financial cash-flow projections based on the above are shown in Table 4 attached to this Annex and yield an expected after tax internal rate of return of 12.4%. Had no escalation been assumed beyond 1981, the after tax return would amount to 5.7%, which is to be compared to the Appraisal Report's 9.2% figure (the latter return was in 1978 \$ and would be close to 11% in comparable 1981 \$). The relatively small magnitude of the decline - despite the large overrun expected - is partly a result of the assumed tax holiday.

C. Economic Analysis

5. Economic return calculations based on revised economic cash-flows (Tables 5 and 6 attached to this Annex) have been made. For better comparison with the Appraisal Report figures, the economic analysis is using the same constant 1978 dollar basis as the latter. Capital costs for the economic analysis are based on the Final Revised Estimate, and exclude duties, escalation and interest during construction (Table 5). Operating costs were not materially changed compared with the appraisal estimates. Most importantly, the natural gas^{3/} price was kept at the Appraisal Report's level of US\$ 0.5 per 1,000 cubic feet, ^{3/} since this assumption appears to be quite adequate when matched with the range of economic gas prices calculated for Bangladesh in a recent study of the country's energy sector^{4/} sponsored by ADB. Sensitivity tests on the crude oil equivalent cost of gas^{4/} were also conducted:

1/ Which placed the first repayment date in early 1980 according to the appraised project and loan schedules.

2/ US\$192 per ton, FOB, bagged, European origin. Source: EPD/CE, May, 1978.

3/ 1978 financial price is US\$ 0.4 per 1,000 cubic feet.

6. The urea price assumed in the Appraisal Report was US\$175 per ton at 1978 prices, out of which US\$ 30 was deemed to reflect CIF costs and local port handling charges. The latest urea price projections prepared by the Commodities and Export Projections Division are, however, significantly higher, on a comparable 1978 \$ basis:

<u>Economic Urea Prices</u> (\$ per ton at constant 1978 prices)						
	<u>Appraisal Report</u>			<u>Based on Latest Price Projections</u>		
	FOB ^{a/} <u>Europe</u>	CIF <u>Charges</u>	Econ. <u>Price</u>	FOB <u>Europe</u>	CIF <u>Charges</u>	Econ. <u>Price</u>
1981	145.0	30.0	175.0	160.4	30.0	190.4
1982	145.0	30.0	175.0	162.5	30.0	192.5
1983	145.0	30.0	175.0	176.0	30.0	206.0
1984	145.0	30.0	175.0	189.6	30.0	219.6
1985	145.0	30.0	175.0	203.2	30.0	233.2

a/ Bagged

7. Two sets of economic price projections based on both the latest commodity price projections and the Appraisal Report's price assumptions have been prepared. Operating rate assumptions are as per the financial analysis (para 2 above). However, sensitivity tests were made on the operating rates to test the impact of a faster production buildup and of higher operating rates.

8. Based on the above assumptions, the base case revised economic return was found to be 12.4 using the latest price projections. Had the Appraisal Report's lower price assumptions been used, the base case revised return would have been 7.6%, i.e. about a third of the appraised base case return of 21.2%. The revised economic return thus appears to be still marginally satisfactory, at least under the assumptions defined as constituting the base case. However, a number of departures from the base case assumptions are possible, and sensitivity analyses have been conducted to evaluate the impact of these and other possible developments on the Project's economic return:

	<u>Latest Price Projections</u>	<u>Appr. Report's Price Projections</u>
A. Base Case	12.4%	10.8%
B. Start-up Delayed to 9/81 (6 mos)	11.4%	10.0%
C. Start-up Delayed to 12/82 (12 mos)	10.5%	9.2%
D. Faster Production Buildup and Higher Capacity Utilization ^{a/}	15.8%	10.8%
E. Capital Costs up 5%	11.7%	6.9%
F. Capital Costs Down 5%	13.2%	8.3%
G. Gas at Crude-Oil Equivalent Value	9.4%	3.6%
H. Combination of B and E.	10.7%	6.1%

a/ First Year 50% Capacity Utilization
Second Year 75%
Third Year and thereafter 90%

9. Using the latest price projections, the Project's expected economic rate of return remains relatively acceptable even under a combination of unfavorable events. However, it should be kept in mind that such a combination is more likely than the occurrence of a single unfavorable event. Based on the Appraisal Report's more cautious price projections, there are a number of departures from the base case which could easily push the Project's expected return under 10%.

10. Finally, it should be mentioned that none of the above calculations are based on treating part or all of the past expenditures as sunk. If one were to assume that 50% of already disbursed expenditures are sunk, the base case economic return would rise from 12.4% to 15.5% using the latest price projections, and from 7.8% to 10.3% using the Appraisal Report's price assumptions.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

PROJECTED INCOME STATEMENTS

(US\$ MILLION)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
CAPACITY UTILIZATION (%)	-	-	-	-	-	-	-	30.00	50.00	65.00	75.00	80.00	80.00	80.00
UREA OUTPUT (1,000 TONS)	-	-	-	-	-	-	-	158.40	264.00	343.20	396.00	422.40	422.40	422.40
UREA UNIT PRICE (\$ TON)	-	-	-	-	-	-	-	190.00	201.40	212.80	226.10	239.40	254.60	269.80
SALES REVENUE	-	-	-	-	-	-	-	30.10	56.36	81.80	106.55	127.41	144.11	161.83
VARIABLE OPERATING COSTS														
GAS (FEED AND FUEL)	-	-	-	-	-	-	-	2.48	4.37	6.01	7.36	8.32	8.84	9.37
BAGGING MATERIALS	-	-	-	-	-	-	-	2.85	5.04	6.92	8.48	9.58	10.18	10.79
CATALYSTS AND CHEMICALS	-	-	-	-	-	-	-	0.20	0.34	0.47	0.58	0.66	0.70	0.74
TOTAL VARIABLE COSTS	-	-	-	-	-	-	-	5.53	9.75	13.40	16.42	18.56	19.72	20.90
FIXED OPERATING COSTS														
LABOUR AND OVERHEAD	-	-	-	-	-	-	-	2.70	2.86	3.02	3.21	3.40	3.62	3.83
MAINTENANCE	-	-	-	-	-	-	-	5.70	6.04	6.38	6.78	7.18	7.64	8.09
INSURANCE AND OTHER	-	-	-	-	-	-	-	1.30	1.38	1.46	1.55	1.64	1.74	1.85
DEPRECIATION	-	-	-	-	-	-	-	29.60	29.60	29.60	29.60	29.60	29.60	29.60
TOTAL FIXED COSTS	-	-	-	-	-	-	-	39.30	39.88	40.46	41.14	41.82	42.60	43.37
TOTAL PRODUCTION COSTS	-	-	-	-	-	-	-	44.83	49.63	53.86	57.56	60.38	62.32	64.27
OPERATING PROFIT	-	-	-	-	-	-	-	(14.73)	6.73	27.94	48.99	67.03	81.79	97.56
INTEREST EXPENSE	-	-	-	-	-	-	-	13.49	22.75	21.03	18.71	16.38	14.04	11.70
BEFORE TAX INCOME	-	-	-	-	-	-	-	(28.22)	(16.02)	6.91	30.28	50.65	67.75	85.86
INCOME TAX	-	-	-	-	-	-	-	-	-	-	-	27.86	37.26	47.22
AFTER TAX INCOME	-	-	-	-	-	-	-	(28.22)	(16.02)	6.91	30.28	22.79	30.49	38.64
AFTER TAX INCOME	-	-	-	-	-	-	-	(28.22)	(16.02)	6.91	30.28	22.79	30.49	38.64
DEPRECIATION ADDED BACK	-	-	-	-	-	-	-	29.60	29.60	29.60	29.60	29.60	29.60	29.60
INTEREST EXPENSE ADDED BACK	-	-	-	-	-	-	-	13.49	22.75	21.03	18.71	16.38	14.04	11.70
CASH FROM OPERATIONS	-	-	-	-	-	-	-	14.87	36.33	57.54	78.59	68.77	74.13	79.94
RATIO ANALYSIS														
OPERATING PROFIT/SALES (%)	-	-	-	-	-	-	-	(48.94)	11.94	34.16	45.98	52.61	56.76	60.29
BEFORE TAX INCOME/SALES (%)	-	-	-	-	-	-	-	(93.75)	(28.42)	8.45	28.42	39.75	47.01	53.06
AFTER TAX INCOME/SALES (%)	-	-	-	-	-	-	-	(93.75)	(28.42)	8.45	28.42	17.89	21.16	23.88
PROFIT BREAK-EVEN POINT (%) OF CAP. UTILIZATION	-	-	-	-	-	-	-	64.46	67.19	58.43	49.80	42.77	36.43	31.26

Table I

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

PROJECTED FUNDS FLOW STATEMENTS

(US\$ MILLION)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
APPLICATIONS OF FUNDS:													
FIXED ASSETS EXPENDITURES	0.22	3.46	11.78	18.31	64.71	127.21	90.56	27.66	-	-	-	-	-
INCREASE IN WORKING CAPITAL	-	-	-	-	-	-	-	8.29	5.53	4.13	2.77	1.38	1.33
INITIAL OPERATING DEFICIT	-	-	-	-	-	-	-	-	-	-	-	-	-
CAPITALIZED INTEREST	-	0.14	0.77	1.97	5.53	12.77	19.61	9.21	-	-	-	-	-
EXPENSED INTEREST	-	-	-	-	-	-	-	13.49	22.75	21.03	18.71	16.38	14.04
LOAN REPAYMENTS	-	-	-	-	-	-	-	-	11.66	23.35	23.38	23.40	23.41
SUB-TOTAL	0.22	3.60	12.55	20.28	70.24	139.98	110.17	58.65	39.94	48.51	44.86	41.16	38.78
SURPLUS CASH BALANCE	-	-	-	-	-	-	-	-	-	9.23	33.87	27.68	35.42
TOTAL FUNDS APPLIED	0.22	3.60	12.55	20.28	70.24	139.98	110.17	58.65	39.94	57.74	78.73	68.84	74.20
SOURCES OF FUNDS:													
CASH FROM OPERATIONS	-	-	-	-	-	-	-	14.87	36.33	57.54	78.59	68.77	74.13
FOR. EXCH. DEBT FINANCING	-	2.79	9.78	14.20	57.04	87.77	49.12	12.52	0.28	0.20	0.14	0.07	-
FOR. EXCH. EQUITY FINANCING	-	-	-	-	-	-	-	-	-	-	-	-	0.07
LOCAL CURRENCY EQUITY FINANCING	0.22	0.81	2.77	6.08	13.20	52.21	61.05	31.26	3.33	-	-	-	-
TOTAL FINANCING	0.22	3.60	12.55	20.28	70.24	139.98	110.17	58.65	39.94	57.74	78.73	68.84	74.20
RATIO ANALYSIS:													
DEBT SERVICE COVERAGE RATIO	-	-	-	-	-	-	-	1.1	1.1	1.3	1.9	1.7	2.0

INDUSTRIAL PROJECTS DEPARTMENT
REPORT PREPARED: 06/28/78

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

PROJECTED BALANCE SHEETS

(US\$ MILLION)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
OPERATING CASH	-	-	-	-	-	-	-	0.08	0.14	0.18	0.21	0.22	0.23
ACCOUNTS RECEIVABLE	-	-	-	-	-	-	-	4.64	7.74	10.05	11.60	12.38	13.12
FIN. AND IN-PROCESS INVENT.	-	-	-	-	-	-	-	2.32	3.87	5.03	5.80	6.19	6.56
RAW MATERIALS	-	-	-	-	-	-	-	1.33	2.21	2.87	3.32	3.54	3.75
SUB-TOTAL	-	-	-	-	-	-	-	8.37	13.96	18.13	20.93	22.33	23.66
SURPLUS CASH BALANCE	-	-	-	-	-	-	-	-	-	9.23	43.10	70.78	106.20
TOTAL CURRENT ASSETS	-	-	-	-	-	-	-	8.37	13.96	27.36	64.03	93.11	129.86
GROSS FIXED ASSETS													
PLANT AND SPARES	0.22	3.68	15.46	33.77	98.48	225.69	316.25	343.91	343.91	343.91	343.91	343.91	343.91
IDC	-	0.14	0.91	2.88	8.41	21.18	40.79	50.00	50.00	50.00	50.00	50.00	50.00
LESS: ACC. DEPRECIATION	-	-	-	-	-	-	-	29.60	59.20	88.80	118.40	148.00	177.60
NET FIXED ASSETS	0.22	3.82	16.37	36.65	106.89	246.87	357.04	364.31	334.71	305.11	275.51	245.91	216.31
TOTAL ASSETS	0.22	3.82	16.37	36.65	106.89	246.87	357.04	372.68	348.67	332.47	339.54	339.02	346.17
ACCOUNTS PAYABLE	-	-	-	-	-	-	-	0.08	0.14	0.18	0.21	0.22	0.23
CURRENT PORTION OF L.T. DEBT	-	-	-	-	-	-	-	11.66	23.35	23.38	23.40	23.41	23.41
TOTAL CURRENT LIABILITIES	-	-	-	-	-	-	-	11.74	23.49	23.56	23.61	23.63	23.64
LONG-TERM LIABILITIES	-	2.79	12.57	26.77	83.81	171.58	220.70	221.56	198.49	175.31	152.05	128.71	105.30
PAID-IN-CAPITAL	0.22	1.03	3.80	9.88	23.08	75.29	136.34	167.60	170.93	170.93	170.93	170.93	171.00
RETAINED EARNINGS	-	-	-	-	-	-	-	(28.22)	(44.24)	(37.33)	(7.05)	15.74	46.23
TOTAL EQUITY	0.22	1.03	3.80	9.88	23.08	75.29	136.34	139.38	126.69	133.60	163.88	186.67	217.23
TOTAL EQU. AND LIABILITIES	0.22	3.82	16.37	36.65	106.89	246.87	357.04	372.68	348.67	332.47	339.54	339.01	346.17
RATIO ANALYSIS													
QUICK RATIO	-	-	-	-	-	-	-	0.40	0.34	0.83	2.33	3.53	5.06
CURRENT RATIO	-	-	-	-	-	-	-	0.71	0.59	1.16	2.71	3.94	5.49
DEBT RATIO (L.T. DEBT AS A % OF L.T. CAPITALIZATION)	-	73.04	76.79	73.04	78.41	69.50	61.81	61.38	61.04	56.75	48.13	40.81	32.65

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

FINANCIAL CASH-FLOW PROJECTIONS

(US\$ MILLION)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
FIXED CAPITAL EXPENDITURES	(0.22)	(3.46)	(11.78)	(18.31)	(64.71)	(127.21)	(90.56)	(27.66)	-	-	-	-	-
INCREASE IN WORKING CAPITAL	-	-	-	-	-	-	-	(8.29)	(5.53)	(4.13)	(2.77)	(1.38)	(1.33)
VARIABLE CASH OP. COSTS	-	-	-	-	-	-	-	(5.53)	(9.75)	(13.40)	(16.42)	(18.56)	(19.72)
FIXED CASH OP. COSTS	-	-	-	-	-	-	-	(9.70)	(10.28)	(10.86)	(11.54)	(12.22)	(13.00)
SALES REVENUES	-	-	-	-	-	-	-	30.10	56.36	81.80	106.55	127.41	144.11
WORKING CAPITAL RECOVERY	-	-	-	-	-	-	-	-	-	-	-	-	-
NET BEFORE TAX CASH FLOW	(0.22)	(3.46)	(11.78)	(18.31)	(64.71)	(127.21)	(90.56)	(21.08)	30.80	53.41	75.82	95.25	110.06
INCOME TAX	-	-	-	-	-	-	-	-	-	-	-	(27.86)	(37.26)
NET AFTER TAX CASH FLOW	(0.22)	(3.46)	(11.78)	(18.31)	(64.71)	(127.21)	(90.56)	(21.08)	30.80	53.41	75.82	67.39	72.80

RETURN ON INVESTMENT = 12.429%

INDUSTRIAL PROJECTS DEPARTMENT
REPORT PREPARED: 06/28/78

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

Capital Cost for Revised Economic Analysis (in constant 1978 US\$)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>Total</u>
<u>Disbursement %</u>	<u>0.1%</u>	<u>0.9%</u>	<u>3.0%</u>	<u>4.9%</u>	<u>16.8%</u>	<u>33.6%</u>	<u>26.4%</u>	<u>11.4%</u>	<u>2.1%</u>	<u>0.8%</u>	<u>100.0%</u>
Actually disbursed	0.2	3.6	12.5	20.2	35.0	-	-	-	--	-	71.5
Remaining to be disbursed	-	-	-	-	35.1	139.9	109.8	47.5	8.7	3.5	344.5
<u>Less: Interest during</u> Construction	-	0.1	0.7	1.9	5.3	12.3	18.8	10.9	-	-	50.0
<u>Less: Duties</u>	-	-	-	2.1	7.6	15.1	11.9	-	-	-	36.7
<u>Less: Escalation</u>	-	-	-	-	3.1	6.1	4.9	2.1	0.4	0.2	16.8 ^{a/}
<u>Adj. to 1978 \$ Basis</u>	0.1	0.9	1.8	1.2	-	-	-	-	-	-	4.0
<u>Constant 1978 \$ Economic</u> <u>Capital Costs</u>	0.3	4.4	13.6	17.4	54.1	106.4	74.2	34.5	8.3	3.3	316.5

^{a/} Excludes US\$8.0 million reflecting depreciation of US\$ against currencies of supplying countries.

Industrial Projects Department
June 1978

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

Revised Economic Projections and Rate of Return Calculation
(in constant 1978 \$)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1986-91</u>	<u>1992</u>
A. <u>Capital Resources Used up by the Project</u>	(0.3)	(4.4)	(13.6)	(17.4)	(54.1)	(106.4)	(74.2)	(34.5)	(8.3)	(3.3)	-	-	17.6
B. <u>Economic Value of Production</u>								26.4	50.8	70.9	87.0	98.5	98.5
C. <u>Economic Production Costs</u>													
Natural Gas (US\$0.5 per 1,000 cubic feet)								(2.9)	(4.1)	(5.3)	(6.2)	(6.6)	(6.6)
Chemicals and Catalysts								(0.3)	(0.5)	(0.6)	(0.7)	(0.7)	(0.7)
Bagging Material								(2.5)	(3.6)	(4.7)	(5.4)	(5.8)	(5.8)
<u>Variable Costs</u>								(5.7)	(8.2)	(10.6)	(12.3)	(13.1)	(13.1)
Labour and Overhead								(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)
Maintenance and other Expenses								(6.5)	(6.5)	(6.5)	(6.5)	(6.5)	(6.5)
<u>Fixed Costs</u>								(8.7)	(8.7)	(8.7)	(8.7)	(8.7)	(8.7)
D. <u>Economic Cash-Flow from Operations</u>								12.0	33.9	51.4	66.0	76.7	76.7
E. <u>Net Economic Cash-Flow for the Project</u>	(0.3)	(4.4)	(13.6)	(17.4)	(54.1)	(106.4)	(74.2)	(22.5)	25.6	48.1	66.0	76.7	94.3

a/ Recovery of economic working capital only.

Industrial Projects Department
June 1978

Table 6

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

**Comparison of Final Revised Estimate with Appraisal Report Estimate
Before Adjustments ^{a/} (US\$ million)**

	<u>Appraisal Report Estimate</u>			<u>Final Revised Estimate</u>			<u>Breakdown of Overrun ^{b/}</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
1. Land Acquisition	0.4	-	0.4	0.3	-	0.3	(0.1)	-	(0.1)
2. Site Preparation	2.1	9.4	11.5	14.2	21.3	35.5	12.1	11.9	24.0
3. Process Equipment	-	36.4	36.4	0.6	55.0	55.6	0.6	18.6	19.2
4. Auxiliary Equipment	-	8.3	8.3	0.6	22.5	23.1	0.6	14.2	14.8
5. Mat. Handling Equipment	-	4.9	4.9	-	4.8	4.8	-	(0.1)	(0.1)
6. Construction Equipment	-	5.3	5.3	0.2	11.3	11.5	0.2	6.0	6.2
7. Miscellaneous Equipment	-	1.2	1.2	0.7	1.8	2.5	0.7	0.6	1.3
8. Buildings and Structures	4.0	6.4	10.4	26.6	8.6	35.2	22.6	2.2	24.8
9. Freight, Insurance and Duties	30.5	0.1	36.6	38.3	7.9	46.2	7.8	1.8	9.6
10. Construction and Erection	6.9	1.9	8.8	12.7	30.3	43.0	5.8	28.4	34.2
11. Services	0.6	24.0	24.6	0.1	19.0	19.1	(0.5)	(5.0)	(5.5)
12. Management Assistance	1.0	4.6	5.6	1.1	17.8	18.9	0.1	13.2	13.3
13. Preoperational Expenses	3.4	1.6	5.0	5.9	0.2	6.1	2.5	(1.4)	1.1
14. Working Capital	7.2	1.3	8.5	21.0	1.1	22.1	13.8	(0.2)	13.6
Base Cost Estimate	56.1	111.4	167.5	122.3	201.6	323.9	66.2	90.2	156.4
15. Physical Contingency	5.4	10.7	16.1	7.1	10.2	17.3	1.7	(0.5)	1.2
16. Price Contingency	18.4	20.2	38.6	2.7	22.1 ^{c/}	24.8	(15.7)	1.9	(13.8)
17. Interest During Construction	27.2	-	27.2	50.0	-	50.0	22.8	-	22.8
Total Project Financing Required	197.1	142.3	249.4	182.1	233.9	416.0	75.0	91.6	166.6

- Notes: ^{a/} See para 4 of ^{main report} Annex I. Said adjustments are shown in Tables 2 and 3 which follow.
^{b/} Final Revised Estimate figure less Appraisal Report figure.
^{c/} Includes US\$ 8.0 million allowance reflecting the impact on budget estimates of the depreciation of US\$ against the currencies of supplying countries.
^{d/} Includes US\$ 10.9 million in interest during construction during additional delay period.

Industrial Projects Department
June 1978

Table 1

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

**Comparison of Final Revised Estimate with Appraisal Estimate
After Allocating Contingencies to Individual Expenditure Categories
and before Adjustment for Difference in \$ Basis ^{a/} of the two Estimates**

(US\$ million)

	<u>Appraisal Report Estimate</u>				<u>Final Revised Estimate</u>				<u>Breakdown of Overrun</u>			
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>%</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>%</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>%</u>
1. Land Acquisition	0.4	-	0.4	0.2	0.3	-	0.3	0.1	(0.1)	-	(0.1)	-
2. Site Preparation	2.6	11.3	13.9	5.6	14.2	21.3	35.5	8.5	11.6	10.0	21.6	13.0
3. Process Equipment	-	44.5	44.5	17.8	0.7	65.0	65.7	15.9	0.7	20.5	21.2	12.7
4. Auxiliary Equipment	-	12.6	12.6	5.1	0.7	26.5	27.2	6.5	0.7	13.9	14.6	8.8
5. Mat. Handling Equipment	-	7.4	7.4	3.0	-	5.7	5.7	1.4	-	(1.7)	(1.7)	(1.0)
6. Construction Equipment	-	6.7	6.7	2.7	0.2	13.3	13.5	3.2	0.2	6.6	6.8	4.1
7. Miscellaneous Equip.	-	1.5	1.5	0.6	0.8	2.1	2.9	0.7	0.8	0.6	1.4	0.8
8. Buildings and Structures	6.9	9.8	16.7	6.7	29.0	10.1	39.1	9.4	22.1	0.3	22.4	13.4
9. Freight, Insurance and Duties	40.1	8.3	48.4	19.3	41.7	9.3	51.0	12.3	1.6	1.0	2.6	1.6
10. Construction and Erection	11.8	2.8	14.6	5.9	13.9	35.7	49.6	11.9	2.1	32.9	35.0	21.0
11. Services	0.7	26.6	27.3	10.9	0.1	22.4	22.5	5.4	(0.6)	(4.2)	(4.8)	(2.9)
12. Management Assistance	1.4	6.6	8.0	3.2	1.2	21.0	22.2	5.3	(0.2)	14.4	14.2	8.5
13. Preoperational Expenses	5.1	2.3	7.4	3.0	6.4	0.2	6.6	1.6	1.3	(2.1)	(0.8)	(0.5)
14. Working Capital	10.9	1.9	12.8	5.1	22.9	1.3	24.2	5.8	12.0	(0.6)	11.4	6.8
Base Cost Estimate	79.9	142.3	222.2		132.1	233.9	366.0		52.2	91.6	143.8	
15. Physical Contingency	----- allocated above-----				-----allocated above-----				-----allocated above-----			
16. Price Contingency	-----allocated above-----				-----allocated above-----				-----allocated above-----			
17. Interest During Construction	27.2	-	27.2	10.9	50.0 ^{b/}	-	50.0	12.0	22.8	-	22.8	13.7
Total Project Financing Required	<u>107.1</u>	<u>142.3</u>	<u>249.4</u>	<u>100.0%</u>	<u>182.1</u>	<u>233.9</u>	<u>416.0</u>	<u>100.0%</u>	<u>75.0</u>	<u>91.76</u>	<u>166.6</u>	<u>100.0%</u>

NOTE ^{a/} Adjustment is made in following Table.

^{b/} Incl. US\$10.9 million interest during construction during additional delay period, allocated from next category below (see Table 1, footnote j/).

Industrial Projects Department
June 1978

Table 2

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

**Comparison of Final Revised Estimate with Appraisal Estimate
After Allocating Contingencies to Individual Expenditure Categories
and Adjusting for Difference in \$ Basis of the Two Estimates
(US\$ million)**

	Appraisal Report Estimate Adjusted to 1978 \$ Basis ^{a/}			Final Revised Estimate Adjusted to 1978 \$ Basis ^{b/}			Breakdown of Overrun (i.e. Real Term Overrun)					
	Local	Foreign	Total	Local	Foreign	Total	Local	%	Foreign	%	Total	%
1. Land Acquisition	0.5	-	0.5	0.3	-	0.3	(0.2)	(0.3)	-	-	(0.2)	(0.2)
2. Site Preparation	3.1	13.5	16.6	14.5	21.8	36.3	11.4	19.7	8.3	12.1	19.7	15.6
3. Process Equipment	-	53.2	53.2	0.7	66.4	67.1	0.7	1.2	13.2	19.2	13.9	11.0
4. Auxiliary Equipment	-	15.1	15.1	0.7	27.1	27.8	0.7	1.2	12.0	17.5	12.7	10.0
5. Mat. Handling Equipment	-	8.9	8.9	-	5.8	5.8	-	-	(3.1)	(4.5)	(3.1)	(2.5)
6. Construction Equipment	-	8.0	8.0	0.2	13.6	13.8	0.2	0.3	5.6	8.2	5.8	4.6
7. Miscellaneous Equipment	-	1.8	1.8	0.8	2.1	2.9	0.8	1.4	0.3	0.4	1.1	0.9
8. Buildings and Structures	8.3	11.7	20.0	29.6	10.3	39.9	21.3	36.8	(1.4)	(2.0)	19.9	15.7
9. Freight, Insurance and Duties	48.0	9.9	57.9	42.6	9.5	52.1	(5.4)	(9.3)	(0.4)	(0.6)	(5.8)	(4.6)
10. Construction and Erection	14.1	3.3	17.4	14.2	36.5	50.7	0.1	0.2	33.2	48.3	33.3	26.4
11. Services	0.8	31.8	32.6	0.1	22.9	23.0	(0.7)	(1.2)	(8.9)	(13.0)	(9.6)	(7.6)
12. Management Assistance	1.7	7.9	9.6	1.2	21.4	22.6	(0.5)	(0.9)	13.5	19.7	13.0	10.3
13. Preoperational Expenses	6.1	2.8	8.9	6.5	0.2	6.7	0.4	0.7	(2.6)	(3.8)	(2.2)	(1.7)
14. Working Capital	13.0	2.3	15.3	23.4	1.3	24.7	10.4	18.0	(1.0)	(1.5)	9.4	7.4
Base Cost Estimate	95.6	170.2	265.8	134.8	238.9	373.7	39.2		68.7		107.9	
15. Physical Contingency	----allocated above---			----allocated above---			-----allocated above-----					
16. Price Contingency	----allocated above---			----allocated above---			-----allocated above-----					
17. Interest during Construction	32.5	-	32.5	51.1	-	51.1	18.6	32.2	-	-	18.6	14.7
Total Project Financing Required	<u>128.1</u>	<u>170.2</u>	<u>298.3</u>	<u>185.9</u>	<u>238.9</u>	<u>424.8</u>	<u>57.8</u>	100.0%	<u>68.7</u>	100.0%	<u>126.5</u>	100.0%

NOTE: ^{a/} Using the international manufactures escalation index between 1976 and 1978 to translate the Appraisal Report Estimate, which was expressed in \$ of 1976 (the center of gravity of the commitment schedule assumed at that time), into \$ of 1978 (the center of gravity of the revised commitment schedule).

^{b/} Using above index to translate the already committed portion of the Final Revised Estimate into \$ of 1978.

D. Financing Plan:

The total cost of the project is currently estimated at \$416 million U.S. dollars equivalent. This revised budget envisions a foreign exchange requirement of \$234 million equivalent with a Taka local currency component of approximately \$182 million equivalent. While the revised capital cost is considerably higher than the budget at time of appraisal, most of the foreign exchange input categories originally foreseen stayed within their estimated costs plus inflation and interim currency fluctuations. (See Table 2 following). What did change substantially were the additional physical inputs required as a result of foundation corrections, delays caused by foundation changes, substitution of expatriate construction materials, equipment and services due to deficiencies of local Bangladeshi resources and increases in some local currency budget items such as with the Housing Colony and Working Capital accounts. As a result of cumulative delays in foundation corrections and civil works design changes, a large portion of normally experienced inflation increases in off-shore procurement of equipment and materials has already been recorded. Notwithstanding, more than two years of on-shore construction and erection activities are yet to be completed before plant commissioning and start-up, therefore normal allowances for contingency and escalation remain with the budget.

The following four tables illustrate the financial aspects of the revised project:

Table 1 is a summary of the revised cost estimate for the project and the total shares projected to be contributed by the various participants. A small local currency component is projected for IDA, ODM and AID as a reserve for priority expenditures if necessary within Bangladesh as an operational contingency for co-financed contracts during the final stages of plant construction. As indicated in the Table, the Bangladesh Government will contribute approximately 43% of total project costs. The estimated AID contribution is thirteen percent.

Table 2 provides a comparative review of project budget items between the 1974 IDA appraisal budget and the currently estimated WBPSI project budget. Escalation and contingency line items are kept separate from other categories to improve budget management and control during implementation.

Table 3 is a more detailed presentation of the revised project budget. A breakdown of which categories will be financed by each contributor is given in Annex G.

Table 4 shows the budget line items projected for financing by AID along with commitments to date. A time-phased disbursement schedule and cash flow for the remainder of the project is provided in the WBPSI evaluation report.

Table 1

<u>Debt</u>	<u>FX</u>	<u>L/C</u>	<u>Total</u>	<u>% of Total</u>
International Devel. Assoc.	\$56.0	\$1.0	\$57.0	13.7
Asian Development Bank	49.0	-	49.0	11.9
A.I.D.	53.0	1.0	54.0	12.9
Min. for Overseas Devel (U.K.)*	29.0	1.0	30.0	7.2
Government of Iran	14.5	-	14.5	3.5
Fed. Republic of Germany (KFW)*	19.0	-	19.0	4.5
Government of Switzerland*	<u>10.5</u>	<u>-</u>	<u>10.5</u>	<u>2.6</u>
Sub-Total	231.0	3.0	234.0	56.3
 <u>Equity</u>				
Government of Bangladesh	<u>3.0</u>	<u>179.0</u>	<u>182.0</u>	<u>43.7</u>
	\$234.0	\$182.0	\$416.0	100.0%
Percent Contribution	56.25%	43.75%		

*These resources are denominated in the currencies of the donor country; their U.S. dollar equivalents are therefore subject to fluctuations in the exchange rates.

Equity financing of the project will be about 43% with debt financing about 57%, which is an acceptable capitalization. In the event that the ratio of foreign and local costs of the project vary significantly from the above, the Government will be permitted convert a portion of the local currency to debt, as the case may be, but the debt/equity ratio shall not exceed 60/40.

TABLE 2

ESTIMATE COMPARATIVE ANALYSISIDA APPRAISAL REPORT NO. 598-BD, DECEMBER 18, 1974

VS

CURRENT WILLIAMS BROTHERS ESTIMATE

US \$ MILLIONS

	<u>Appraisal Estimate 1974</u>				<u>WB Estimate April 1974</u>			
	(1) <u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>%</u>	(2) <u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>%</u>
1. Land Acquisition	0.4	-	0.4	0.2	0.24	-	0.24	0.07
2. Site Preparation	2.1	9.4	11.5	6.9	14.16	21.32	35.48	10.96
3. Process Equipment	--	36.4	36.4	21.7	0.61	54.96	55.57	17.17
4. Auxiliary Equipment	-	8.3	8.3	5.0	0.55	22.45	23.00	7.11
5. Material Handling Equip.	-	4.9	4.9	2.9	0.02	4.75	4.77	1.47
6. Construction Equipment	-	5.3	5.3	3.2	0.23	11.28	11.51	3.56
7. Miscellaneous Equipment	-	1.2	1.2	0.7	0.71	1.78	2.49	0.77
8. Buildings & Structures	4.0	6.4	10.4	6.2	26.61	8.64	35.25	10.88
9. Freight, Ins. & Duty	30.5	6.1	36.6	21.8	38.31	7.88	46.19	14.27
10. Construction & Erection	6.9	1.9	8.8	5.3	12.74	30.30	43.04	13.30
11. Services	0.6	24.0	24.6	14.7	0.05	19.00	19.05	5.89
12. Management Assistance	1.0	4.6	5.6	3.3	1.13	17.79	18.92	5.85
13. Preoperational Expense	3.4	1.6	5.0	3.0	5.85	0.22	6.07	1.88
14. Working Capital	7.2	1.3	8.5	5.1	20.95	1.12	22.07	6.82
Base Cost Estimate	56.1	111.4	167.5	100.0	122.16	201.49	323.65	100.0
15. Contingency	5.4	10.7	16.1		3.96	7.62	11.58	
16. Escalation	18.4	20.2	38.6		2.70	22.12	24.82	
17. Interest	27.2	-	27.2		39.00	-	39.00	
18. Delay Costs	-	-	-		14.18	2.77	16.95	
Total Project Cost	107.1	142.3	249.4		182.00	234.00	416.00	

Note (1) US \$ = TK 7.5

(2) US \$ = TK 15.0

TABLE 3
ASHUGANJ FERTILIZER PROJECT
WILLIAMS BROTHERS ESTIMATE
 PRESENTED IN
APPRAISAL REPORT FORMAT
EQUIVALENT - US \$ MILLIONS
 US \$ = TAKA 15

<u>Appraisal Report Category</u>	(1) <u>Local Currency</u>	<u>Foreign Currency</u>	<u>Total</u>
1.0 Land Acquisition	236	-	236
2.0 Site Preparation			
2.1 Earth Fill	2,018	7,536	9,554
2.2 Roads, H.C. Boundary Wall	800	-	800
2.3 Dynamic Compaction	690	4,610	5,300
2.4 Consultant-Dynamic Compaction	5	450	455
2.5 Railway	2,900	-	2,900
2.6 Civil Materials	1,575	839	2,414
2.7 Civil Subcontract	6,172	7,569	13,741
Sub Total	14,160	21,324	35,484
3.0 Process Equipment Materials and Spare Parts			
3.1 Ammonia Unit	475	37,975	38,450
3.2 Urea Unit	136	12,054	12,190
3.3 Catalyst and Chemicals	-	2,000	2,000
3.4 Delay and Storage Charges	-	2,930	2,930
Sub Total	611	54,959	55,570
4.0 Auxiliary Service Equipment, Materials and Spare Parts			
4.1 Power, Instr. & Plant Air, Boiler, Inert Gas	-	8,700	8,700
4.2 Ammonia Stg., Refrig., & Bottling	113	1,263	1,376
4.3 Cond. Stripping, Water Treatment, Cooling Tower	22	5,530	5,552
4.4 Substation, Dist., Lighting	322	1,728	2,050
4.5 Sewer & Eff. Treating	-	255	255

<u>Appraisal Report Category</u>	(1) <u>Local Currency</u>	<u>Foreign Currency</u>	<u>Total</u>
4.6 Firewater, Nat. Gas, Chemical Stg. & Common to all Materials	90	4,166	4,256
4.7 Delay & Storage Charges	-	780	780
Sub Total	547	22,452	22,999
5.0 Material Handling Equipment & Spare Parts			
5.1 Material Handling	20	4,448	4,468
5.2 Delay and Storage Charges	-	300	300
Sub Total	20	4,748	4,768
6.0 Construction Equipment			
6.1 Equipment	142	9,200	9,342
6.2 Small Tools	83	883	966
6.3 Leased Equipment	-	1,200	1,200
Sub Total	225	11,283	11,508
7.0 Miscellaneous Equipment			
7.1 Maintenance Machinery	-	749	749
7.2 Miscellaneous Equipment	712	842	1,554
7.3 Delay and Storage Charges	-	190	190
Sub Total	712	1,781	2,493
8.0 Buildings and Structures			
8.1 Materials	2,002	3,358	5,360
8.2 Subcontracts			
8.2.1 Administration	425	-	425
8.2.2 Gate/Fire Station	151	-	151
8.2.3 Maintenance	710	-	710
8.2.4 Laboratory	151	-	151
8.2.5 Control House	231	-	231
8.2.6 Bulk Storage	698	-	698
8.2.7 Bagged Storage	1,206	-	1,206
8.2.8 Pier	1,500	2,300	3,800
8.2.9 Compressor House	1,300	500	1,800
8.2.10 Ammonia Bottling	60	-	60
8.2.11 Hose House and Shelter	5	-	5
8.2.12 Substation	175	-	175
Sub Total	6,612	2,800	9,412
8.3 Housing Colony	15,070	550	15,620
8.4 Housing Colony Furnishings	2,925	1,935	4,860
Sub Total	26,609	8,643	35,252

<u>Appraisal Report Category</u>	(1) <u>Local Currency</u>	<u>Foreign Currency</u>	<u>Total</u>
9.0 Freight, Insurance and Duty			
9.1 Ocean Freight	-	7,875	7,875
9.2 Local Freight	1,536	-	1,536
9.3 Duty	36,771	-	36,771
Sub Total	38,307	7,875	46,182
10.0 Construction and Erection			
10.1 Field Labor	3,715	-	3,715
10.2 Local Supervision	647	-	647
10.3 Field Office Expense	110	20	130
10.4 Temporary Facilities	2,493	1,500	3,993
10.5 Construction Labor Training	1,921	3,330	5,251
10.6 Field Supervision	1,245	13,076	14,321
10.7 Subcontracts			
10.7.1 Tanks	5		5
10.7.2 Refractory	100	1,000	1,100
10.7.3 Chem Clean/NDT	-	500	500
10.7.4 Piping	427	4,320	4,747
10.7.5 Instruments	300	2,982	3,282
10.7.6 Electrical	353	3,518	3,871
Sub Total	1,185	12,376	13,561
10.8 Expatriate Income Taxes	761	-	761
10.9 Insurance	667	-	667
Sub Total	12,744	30,302	43,046
11.0 Services			
11.1 General Contractor Fee	-	19,000	19,000
11.2 Consultants	50	1	51
Sub Total	50	19,001	19,051
12.0 Management/Technical Assistance			
12.1 Management Assistance	865	10,351	11,216
12.2 Technical Advisor	67	2,000	2,067
12.3 Construction Supervision	200	5,435	5,635
Sub Total	1,132	17,786	18,918

<u>Appraisal Report Category</u>	(1) <u>Local Currency</u>	<u>Foreign Currency</u>	<u>Total</u>
13.0 Preoperational Expense			
13.1 AFCC Staff Training	268	-	268
13.2 Start-up	33	-	33
13.3 AFCC Overhead	5,553	220	5,773
Sub Total	5,854	220	6,074
14.0 Working Capital	20,950	1,120	22,070
BASE COST ESTIMATE	122,157	201,494	323,651
15.0 Contingency			
15.1 AFCC	3,538	340	3,918
15.2 FUL	422	7,240	7,662
Sub Total	3,960	7,610	11,550
16.0 Escalation/Currency Adjustment			
16.1 AFCC	-	-	-
16.2 FUL	2,700	14,120	16,820
16.3 Currency Adjustment	-	8,000	8,000
Sub Total	2,700	22,120	24,820
17.0 Construction Interest Allowance	39.00	-	39.00
18.0 Delay Costs			
18.1 Field Labor	2,070	-	2,070
18.2 Supervision	187	1,866	2,053
18.3 Indirect Materials	515	908	1,423
18.4 Construction Interest	11,410	-	11,410
Sub Total	\$14,182	2,774	\$16,956
TOTAL CAPITAL COST	\$182,349	\$233,818	\$416,167

E. Other Aspects

This project directly supports and relates to the recently approved Bangladesh Fertilizer Distribution Improvement Program (#0038). Except for some minor differences as to indirect primary beneficiaries (e.g. 1200 AFCC plant operators, etc.), the primary beneficiaries are the same rural Bangladeshi farmers as identified in Project #0038. In view of this, the socio-cultural aspects, role of women, etc., are as presented in the Fertilizer Distribution paper and are not re-evaluated herein for reasons of economy. A brief summary/extract of these sections is included in Annex C.

Environmental Considerations

There are presently no statutory regulations criteria in Bangladesh governing the emission of atmospheric pollutants or effluents. However, the Ashuganj plant is designed and being constructed to include the latest improvements in process technology, energy conversion and waste treatment of emissions. The plant design is in accordance with U.S. and European standards with respect to solid, liquid, and gaseous emissions and considerable investments have been made with respect to problem detection, emergency control equipment, fire-fighting systems and medical facilities. In addition, training is being given to AFCC technicians and operators regarding safe operating procedures, plant safety inspections, industrial hygiene and enforcement of regulations. Expatriate operators and advisors will be employed for the first two or three years to oversee plant operations until AFCC personnel are capable of performing their duties to acceptable standards. Explosion-proof motors, switchgear and other such equipment will be installed within the plant. The only raw materials used by the process are natural gas from the Titus Field and water from the Meghna River. The Titus gas is particularly suited for fertilizer production because it has few impurities and contaminants. There are minute amounts of sulfur in the gas, but it will be removed as either elemental sulfur or as metallic sulfides, both of which have commercial value and will be sold to manufacturing firms requiring sulfur. The urea dust from the prilling tower will be recovered not only for environmental considerations, but because it is a recoverable substance of value. Sources of liquid effluents such as water treatment plant discharges, purges from the cooling towers, boilers and compressors, plant washdowns, etc., will be treated prior to discharge into the river. The temperature of discharge and cooling

water will be approximately 15° above intake temperatures, but due to the miniscule quantities in comparison with even minimum river flows, no adverse ecological impact is foreseen. Effluent from the housing colony is being processed through a waste treatment plant prior to discharge into the river. Mufflers and scrubbers are being installed on appropriate exhaust stacks.

Special efforts and considerable expense have been allocated to minimizing the potential ecological problems and safety hazards associated with the plants being situated near a major waterway and populated area. The question of physical site stability, which emerged after hydraulic filling of the site was completed, was basically one of ecological consequences if an earthquake were to occur while the plant was operating. In keeping with sound environmental practices, lengthy technical investigations were conducted and a number of alternative corrections evaluated which would result in the plant being protected against serious damage during an earthquake of calculated probability of incidence, intensity and duration. This possible incident and the damage which might be inflicted on the plant and people in the immediate area precipitated a decision between the Government and the lenders to take adequate measures to reduce the probability of serious losses and protect the people from harm. These corrective measures have cost substantial sums and delayed the project for more than one and a half years, but the investment is considered both essential and worthwhile when compared with the negative potential consequences of doing nothing. By taking these measures, as well as others, the project implementors have clearly demonstrated their concern for environmental issues and commitment to constructing a plant that will be ecologically and economically successful. In view of protective actions being taken and continuing management awareness of environmental matters, it is concluded that the project will be properly completed and operated and no adverse environmental impact will be generated.

PART IV. IMPLEMENTATION PLANNING

A. Administrative Arrangements

The original project paper and the foregoing have given adequate details on implementation of the project. The following summary of roles is presented for clarity.

1. Host Country Responsibilities

The BDG will be responsible for overseeing implementation of the project by AFCC and its expatriate management and technical consultants. AFCC will be responsible for coordination of various participants and expenditure of A.I.D. and other donor project funds. AFCC and its project management consultant will be responsible for project planning, daily activities to meet the project schedule, cost control, program expenditures documentation, inspections and periodic evaluations of project progress. A.I.D. funds will be allocated for certain project activities, but in the event other lenders' funds need shifting or substitutions based on source/origin constraints A.I.D. funds may be re-allocated to assume financing of such items if procurement procedures followed and source/origin conditions are satisfactory. Implementation and financing mechanisms used for the project to date will continue. Any adjustments thereto shall be approved beforehand in writing by A.I.D.

2. Role of A.I.D.

Primary implementation responsibility will continue to be vested in USAID/Dacca. AID/W will continue backstopping the Mission on procurement matters and coordination with other project donors. The USAID Project Committee shall be responsible for ongoing monitoring of plant construction, commissioning and preparation of AFCC to operate the plant. The Engineering Office will be responsible for maintaining close contact with construction participants and field inspection of activities. The Project Committee will be responsible for periodic evaluations recommending any mid-course corrections required to accomplish the purposes of the project. The USAID will keep AID/W advised of progress and notify it when backstopping actions or approvals are required. All divisions will perform their respective functions under the direct guidance of the USAID Director.

B. Implementation Plan

1. Implementation Responsibilities

Project planning, scheduling and decision-making shall be the responsibility of AFCC and its extrajurisdictional project consultants. The overall construction plans have been prepared and is being maintained by the General Contractor. Plans for operations training, plant commissioning and start-up shall be prepared and updated as appropriate by the project consultants, general contractor and AFCC. Details of the WBPSI project management/implementation plan are contained in Annex H. The construction implementation plan and control estimates are on file in Foster Wheeler and AFCC offices.

2. Implementation Schedule

<u>Date</u>	<u>Activity</u>
July, 1978	Project Authorization
August, 1978	Project Agreement Amendment signed
September, 1978	Initial Conditions Precedent met
September 1978	Start mechanical erection
October, 1978	Secondary Conditions Precedent met
December, 1978	Complete compensatory foundations
January, 1979	Commitments complete
August, 1979	Completion auxiliary facilities
July, 1980	First process facilities complete
November, 1980	Terminal Date for Commitments
December, 1980	Mechanical completion
March, 1981	Commissioning and start-up
September, 1981	Project Assistance Completion Date

C. Evaluation Plan

In view of the just-completed in-depth evaluation by WBPSI and the currently projected mechanical completion date of late 1980, the balance of the project should be reviewed in accordance with the following schedule:

July, 1979	Mid-course progress evaluation, including AFCC training program.
March, 1980	Review of cost control and preparations for mechanical completion and testing

October, 1980	Review of plant commissioning
March, 1981	Evaluation of construction and plant start-up
December, 1981	Final project evaluation

Assistance will be expected from AID/W and the other donors for the review and evaluation schedule outlined above.

D. Conditions Precedent and Covenants

In view of the operational and financial needs of construction activities at site and the fact that existing project foreign exchange resources are all committed to date, it has been the informal suggestion of the other Lenders that A.I.D. make some of its supplementary financing resources available to the Project as soon as possible. In particular, several critical project construction activities and the purchase of some equipment and materials previously nominated for A.I.D. financing will have to be supported with financial commitments prior to the projected availability or effectiveness of the separate lender agreements. It has therefore been proposed that A.I.D. go forward as early as possible with its new agreement or amendment and "tranche" its supplementary financing such that some is made available immediately with a later "tranche" made effective when the other Lenders' supplementary agreements are finalized. This is the background and reason for structuring the Conditions Precedent as follows:

1. Conditions Precedent to Initial Disbursement

Prior to release of the first tranche (amount to be determined) and any disbursements under this Loan, Borrower shall, except as A.I.D. may otherwise agree in writing, 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 the Agreement or Amendment making available these funds 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 that the Project Agreement executed on behalf of AFCC is amended, duly authorized and ratified such that all necessary corporate, administrative and governmental actions have been completed to make the proceeds of this Loan available to AFCC for the Project;

c. Evidence that the Government and AFCC are pursuing in good faith and with progress satisfactory to A.I.D. the negotiations and development of agreements with the Other Lenders for obtaining the additional financing needed for the Project;

d. Evidence that the Government and AFCC have made arrangements to obtain interim consulting services to cover project management needs until adequate services are secured for the balance of the construction and commissioning period.

2. Conditions Precedent to Subsequent Disbursements

Prior to release of the balance of funds (second tranche) for financing project activities, Borrower shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in a form and substance satisfactory to A.I.D.:

a. Evidence that the Government and AFCC have entered into agreements with each other and the Other Lenders for obtaining the additional financing needed for the Project;

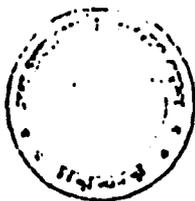
b. Evidence that AFCC has entered into a contract(s) to obtain adequate management assistance to control project activities, complete and commission the plant and capacitate AFCC for initial production operations.

3. Covenants

The Government covenants and warrants that, except as A.I.D. may otherwise agree in writing, the Borrower shall:

a. Provide and utilize for the Project financial and other resources compatible with the Resources Plan to be attached as part of Annex I, Project Description, to the Loan Agreement.

b. Sustain its project obligations, responsibilities and covenants as agreed to in Article V of the original Loan Agreement, dated 2/12/1975.



ANNEX A

"Government Application for Ministry of Planning Assistance"

External Resources Division

Government of the People's Republic of Bangladesh

From: Syed Amir Rahman,
Deputy Secretary.

Shor-E-Bangla Nagar
Dacca-15

File D-8

16. Dec

1/4

No. BPD-7(4)101- 527/75

Date: 2.1.78

Dear Mr. Dennis,

1/4

" Please refer to Para-3(c) of the Aide Memoire dated the 13th December, 1977 regarding the Ashuganj Fertilizer Project Credit No. 527-ED. which stipulates past December 1977 as the last date by which the Government would make a request to the lenders for arranging the additional funds for the project.

2. We regret not being able to put our request within the stipulated time as the issues ^{of projects} relating to the additional foreign exchange cost was placed before the Special ECRES meeting for approval of the Government. The revised cost estimate has been approved by the Government on the 2nd January, 1978. Under the existing terms of agreement with the lenders, project aid amounting to US \$ 142.00 million is available. As per the latest revised estimate the foreign exchange requirement for the project stands at US \$ 188.25 million. This cost over-run of US \$ 46.00 million is needed to be financed. Detailed break-up of original and revised foreign exchange cost is shown in annexure-1)

3. I would now like to request you to please inform IDA Washington, and arrange the additional foreign exchange cost requirement of US \$ 46.00 million by distribution among various lenders, at an early date. >>

With regards,

Yours Sincerely,

(Signature) 21/1/78

(Syed Amir Rahman)

Mr. Dennis,
Chief of the Mission,
ISRD, Local Office,
Dacca.

EXECUTIVE SUMMARY
TECHNICAL CONSIDERATIONS REGARDING SITE SUITABILITY

ASHUGANJ AMMONIA/UREA PLANT
ASHUGANJ, BANGLADESH

FOR THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
OCTOBER 1976-JUNE 1978

General

The following is a summary of the technical considerations and corrective measures regarding preparation of a suitable site for the proposed ammonia/urea plant at Ashugan, Bangladesh. Dames and Moore became involved with the project in a consulting review capacity beginning in early October 1976 when A.I.D. first advised us that serious technical questions had surfaced during the geotechnical investigation completed by others for design purposes. The planned construction schedule had been disrupted considerably by delays to resolve questions of seismic risk and liquefaction potential, ground improvement and dewatering for construction. A.I.D. was one of seven members of an international lending consortium which was assisting the Government of Bangladesh with the project. Because of project scheduling and cost implications and the complexity of various technical issues and proposals for resolving the foundation problems, the lenders decided to retain an independent geotechnical consultant to examine the issues and help the lenders arrive at an economic solution to the problem. The services of Dames and Moore were therefore engaged by A.I.D. under Dames and Moore's existing A.I.D. Requirements Contract No. AID/otr-C-1304.

Seismic Risk and Liquefaction Potential

Selection of a site for the facility began in 1966, but was interrupted by the war precipitating Bangladesh's emergence as an independent country. Final site selection was completed in 1971 when the Bangladeshi firm of Projnani Sansad completed a limited soils investigation. The topography of Bangladesh in the region of the site is low and flat, subject to widespread annual flooding during the monsoon season. Thus, for a significant industrial facility, it was necessary to create a site by dredging soils from the adjacent Meghna river to build what would in effect be an elevated "island" site during monsoon flooding. As a part of the Projnani Sansad investigation, they

prepared a set of plans and specifications for dredging of the river and hydraulic filling of the site.

AFCC subsequently retained the joint venture of Scientific Design, Ltd. of London and James Chemical Engineering of New York as technical advisers, principally in process engineering and secondarily, site engineering. A new set of plans and specifications were prepared by Scientific Design for site preparation and a contract was let to the Vinnell Corporation of California for dredging and site filling; the site preparation being inspected by James Chemical Engineering Company. This work involved the placement of 5 to 8 meters of hydraulic fill and was completed over the period June-December 1975. At that time, apparently based on the work by Projnani Sansad and later by the two technical advisers, the lenders were under the impression that the site was suitable for construction of the planned fertilizer plant.

AFCC then retained Foster Wheeler, Ltd. (FWL) of Reading, England for design and construction of the plant. Foster Wheeler in turn retained Soil Mechanics, Ltd. (SML) of Bracknell, England to conduct the subsurface investigation for design.

1. The area was very active seismically;
2. The hydraulic fill, placed to create the site, and the naturally occurring soil profile of silts and fine sands to depths of about 25 meters (80 feet) were subject to loss of strength and failure (a phenomena known as "liquefaction") under levels of earthquake shaking that had a high probability of occurring;
3. Although remedial measures might be taken to help prevent liquefaction of the upper 20 meters (65 feet), a lower layer of silt at about 25 meters depth was subject to liquefaction and this occurrence would likely lead to a large scale failure of much of this "island" site by sliding into the river over the plane of weakened soil at 25 meters depth.

The consequences of SML's forecasting led to the following alternatives:

- a. To abandon the site, resulting in at least a two year delay in the project; at the levels of loss in production income (estimated, we understand, at up to \$10,000,000 dollars per month) and possibly resulting in total reconsideration of the project justification;
- b. To commit up to \$40,000,000 in costs for improvement of the site which would take a period of twelve to eighteen months to complete. Improvements would include such measures as deep compaction of the soil mass, and removal and replacement of the fill while installing extensive drainage systems to alleviate the build up of ground water pressures occurring during earthquake shaking. It was made clear that, despite such remedial measures, there still existed a considerable risk of liquefaction of the soils at 25 meters depth (below the depths of effective soil stabilization) which would lead to instability of the island site (reference 3 above).

Dames and Moore became involved in the project through A.I.D. at this point, to provide a second opinion and review of the options offered by Soil Mechanics and Foster Wheeler. To assist AID and the other lenders in making a rational decision as to whether to proceed with the project at the site selected, we obtained the site investigation data from SML and other pertinent data to complete our own independent evaluation of seismic risk, liquefaction potential and overall island stability. This data was obtained from SML in meetings in London in early November 1976 and the results of our studies forwarded to AID in a 17 January 1977 report (reference, "Earthquake Engineering Studies, Proposed Ammonia/Urea Plant, Ashuganj, Bangladesh").

Our earthquake engineering studies arrived at conclusions substantially different from those of Soil Mechanics Ltd. Our evaluation of seismic risk led to a substantially lower level of ground surface acceleration recommended as the basis for the design. This evaluation developed from consideration of a wider base of historical earthquake data, regional tectonics and attenuation rates. Our evaluation of the liquefaction potential led to our recommendation that, on the whole, the soils at the site possess a substantially greater resistance to liquefaction than that reported by Soil Mechanics Ltd., based on an analysis we consider to be more consistent with the state-of-the-art in this field. Finally, we offered our opinion that questions of total island instability were based on analyses fundamentally unsound and that any deep seated movement of the site during earthquake shaking was extremely

unlikely. Included in our evaluation of the liquefaction potential of the soils was our conclusion that the silty soils, which represented the original ground surface prior to filling of the site, had substantial risk of liquefaction under the level of earthquake shaking we recommended for use in design. (We recommended a horizontal ground surface acceleration equal to 15 percent of gravity for 10 cycles induced by a Magnitude 7 earthquake for design conditions) We therefore recommended that use of the site under this design condition must be preceded by the densification of the soil mass to 10 meters (33 feet) depth to preclude the possibility of liquefaction. It should be noted that as a loose, compressible strata, these surficial silts are soils we feel should normally have been removed prior to filling.

Immediately following submission of our earthquake engineering studies, we began work on an addendum to that report to consider appropriate techniques of improving (densifying) the soil mass and the extent to which, for static support considerations alone, we felt improvement of the soils was necessary. This report was submitted 3 February 1977 to A.I.D. (reference, "Site Improvements and Foundation Considerations, Proposed Ammonia/Urea Plant, Ashuganj, Bangladesh"). In this report we recommended that techniques of "dynamic compaction" would be most reliably used to densify the site. Dynamic compaction is relatively simple in concept and consists of repeated drops of a large weight in a grid pattern across the site. Further, we recommended in this addendum that for those very heavily loaded, settlement sensitive structures primarily involved with the ammonia/urea process that densification be extended to 20 meters depth to develop a natural mat of dense soils which would mitigate these settlements.

Densification

Following a series of meetings held in London in mid-February 1977 among the lenders, AFCC, SML, FWL and Dames & Moore, our recommendations of seismic risk, liquefaction potential, island stability, and ground improvement were generally accepted by the lenders.

On 6 June 1977 AFCC signed an agreement in Dacca with the firm of Techniques Louis Menard (TLM) of Paris for dynamic compaction of about 30 acres of the site to 10 meters depth and 8 acres of the 65 acre site to 20 meters

depth. Subsequently, AFCC included an additional 6 acres in the area defined for 10 meters densification.

It had been presumed by all parties involved that SML would inspect and evaluate the dynamic compaction work on site, as consultants to FWL. However, in late June we received notice that a dispute had arisen between SML and Menard over patent infringement questions not associated with this project. Since SML would not proceed, we were requested in August to replace them for the review of dynamic compaction and testing procedures and oversaw this work through its completion, on schedule, in mid-March 1978. On 30 May 1978 we issued an extensive report detailing our opinion that dynamic compaction was successful in improving the soils both for static support and elimination of the potential for liquefaction under the design earthquake, (reference, "Geotechnical Consultancy Related to Dynamic Compaction, Ashuganj Fertilizer Plant Site, Ashuganj, Bangladesh")

Foundation Design

Concurrent with our surveillance of dynamic compaction, we were retained by A.I.D. to review the foundation designs being completed by Foster Wheeler Ltd. This effort included review of plans and calculations. In our report issued to A.I.D. on 3 February 1978, we noted that the foundation designs as completed will safely support the design loads of the structures in the complex (reference "Foundation Design Review, Proposed Ammonia/Urea Plant, Ashuganj, Bangladesh"). However, we further noted our opinion that the foundations of several of the key structures were over-conservatively designed and did not take economic advantage of the improved strengths of the soils treated by dynamic compaction. We did not recommend redesign in view of the structures because the time lost would have cost much more in lost production and increased construction costs than could be saved in the redesign of the foundations.

Dewatering

As a part of our foundation design review we also noted the criticality of the dewatering operations which would necessarily accompany excavation and construction of the major foundations. These foundations extend about 2.5 meters (8 feet) below the monsoon ground water level, and as very large excavations, will require extensive dewatering during construction. This work was originally intended to begin immediately following the completion of dynamic compaction work in mid-March 1978.

As a part of an agreement signed with AFCC in early 1978, the Korean Development Corporation (KDC) was sub-contracted to FWL as a specialty firm to complete construction of the deep foundations, as well as other key works, such as slip-forming the prill tower, a 75 meter (250 feet) high concrete cylinder. As a part of their contract negotiations, KDC agreed to install a system of deep wells about the major excavations from which they would pump to lower the ground water level for construction. KDC arrived on site in March but were inadequately prepared to complete the work as was previously outlined. They were also unable to complete a satisfactory pumping test both SML and ourselves had recommended as a necessity for adequate final design of the dewatering system.

KDC proposed a redesign of the well system and remained at an impasse through May with FWL, who refused to allow a redesign without demonstration of its effectiveness. In early May, Dames & Moore provided AFCC a senior level ground water/dewatering engineer to Bangladesh to review the situation. Over the period of about two weeks a redesigned system was agreed upon and it is our opinion that this new system, though radically different from that proposed, represents a workable solution to the construction dewatering problem. As a part of this redesign, a meaningful pumping test was completed. Supervision of KDC's construction efforts for AFCC will be the responsibility of Foster Wheeler. The involvement of Dames and Moore is expected to be minimal now that the site stability and foundation construction issues are decided.

1. Socio-Cultural Considerations

a. The Social Landscape

The population of Bangladesh is approximately 83.5 million with 90 percent living in rural areas and substantially dependent on agriculture and agro-related industries for their livelihood. In addition, any upper and middle class urban dwellers retain title to agricultural land and receive income from agricultural production. Although agriculture accounts for 54 percent of Bangladesh's gross domestic product, per capita food production is among the lowest in Asia.

An important element of the social hierarchy in rural Bangladesh is the land tenure system. Land is considered the most secure form of investment and a primary determinant of social status in rural Bangladesh. In a situation where institutions are weak, resources scarce and population expanding rapidly, land ownership is the firmest guarantee that one can provide the necessary subsistence for one's family.

Under Moslem inheritance practices, all sons are entitled to equal shares of their father's land, while daughters receive lesser shares. This leads to a perceived need to pass on to one's sons sufficient land to ensure their survival and that of their families. Thus the pressure to hold on to the land one has, or, if possible, acquire new land is enormous. Given these pressures, profits derived from agricultural production are very likely to be invested in procuring additional land. Conversely, agricultural production losses, over a period of time, are apt to result in the loss of land.

Previous research into the land tenure situation has cast most Bangladeshi farmers as small landowners. That is, most farmers own small holdings which they till with their own and family labor. The Bangladesh Government's Land Occupancy Study has indicated this is not the case and, in fact, the owner-cultivator, as defined above, is more the exception than the rule. The Study indicates that 38.8 percent of the farmers till the soil in whole or in part on a sharecrop or lease arrangement. An equal amount of land is estimated to be cultivated by agricultural laborers supervised by owner-managers.

There are three general groups of Bangladeshi agricultural participants:

1. Sharecroppers - Those who own no land, except possibly their homestead, and till and land of others in exchange for a share of the crop.

2. Owner-cultivators - Those who till their own land using their own or family labor.

3. Owner-managers - Those who oversee the cultivation of their own land by agricultural laborers.

b. Motivation

The primary motivating factor for all three of the principal tenurial groups to adopt fertilizer is economic, but dependent on the financial situation of the farmer and his benefit/cost allowances with respect to investments in agricultural inputs.

The sharecropper normally bears the full cost of inputs (seed, labor, fertilizer, animal power, etc.) while paying exorbitant interest rates to non-institutional sources to meet his credit requirements. At the same time, he is required in nearly all cases to surrender half of his crop to his landlord at the time of harvest. Under these conditions he is in a poor position to undertake further investments and is in constant danger of losing cultivation rights to the landlord.

Owner-cultivators are in a much better position, if only because they can keep their own crop. In addition, their status as landowners at least entitles them to low-cost institutional credit, even though only a minority are in practice able to obtain it.

The owner-manager faces much the same situation as the owner-cultivator. The very nature of his status, however, indicates that he is in a position to be more "risk taking" and innovative than either of the other two groups. It is unlikely that a single crop failure will result in a decline in his status, although inheritance practice may place his children in the owner-cultivator category. A key element for both the owner-cultivator and the owner-manager is that increased income will tend to be used for the acquisition of more land, displacing marginally productive landowners. This substitution may, however, be necessary to achieve country level goals of self-sufficiency in food production and, providing off-farm employment is increased, could result in improved living standards for all Bangladeshis. Increased returns on production and the continued decline in agricultural wages to farm labor ^{1/}, could attract present absentee landlords into the ranks of the owner-managers, thereby contributing to the forces tending toward the decline of the sharecropper.

2. Spread Effect: The Diffusion of Innovation

A major objective of the Fertilizer Distribution Project relates to removal of the marketing constraints by strengthening the private

^{1/} The Quarterly Journal of the Bangladesh Institute of Development Studies, Vol. IV, No. 4, October, 1976, "Institutional Change and Agricultural Wages in Bangladesh!" by Edward Clay.

sector role at the retail and wholesale levels. In this context it is important to note that there is a considerable lack of entrepreneurship in rural Bangladesh. A number of hypotheses have been advanced as reasons for this phenomenon. Among these are:

1. Entrepreneurs are attracted to the urban areas by better opportunities;
2. Economic policies are not conducive to entrepreneurship;
3. Lack of credit, adequate transportation, communication systems, and rural electricity hamper investment in rural industries and services;
4. The culture in Bangladesh gives relatively high status to the professions and civil service and relatively low status to businessmen or traders;
5. Much of the mercantile class (historically mostly Hindu) have left Bangladesh, leaving a void which has only been partially filled; and
6. Where resources and wealth are perceived to be fixed and one man's gain is another's loss, profit-seeking entrepreneurs are viewed with a great deal of suspicion.

In view of the above, it is critical that the BDG actively foster a climate favorable to entrepreneurship and direct its policies toward the creation of reliable commercial dealers. By improving fertilizer distribution, the maximum number of owner-cultivators and levels of rural employment will be sustained.

3. Social Consequences and Benefit Incidence

It has been previously noted that present output price - input cost relationships work largely to the advantage of the larger, relatively well-to-do farmers. This section addresses the question of the role the proposed project will likely play in the social context. The answer appears largely favorable.

a. Access to Resources and Opportunities

As examined in 2 above, the present situation of owner-cultivator farmers is sufficiently favorable to enable investment either in fertilizer itself or in HYV technology which includes fertilizer. The position of the tenant farmer is such that he probably cannot afford an HYV investment (and HYV's will account for the bulk of future fertilizer use) barring supportive policies in the areas of assured output prices and institutional credit. Even then, an investment in HYV technology will appear a marginal proposition to most sharecroppers.

The position of the sharecropper with respect to a purely fertilizer investment is more favorable. Given its lower (than the full HYV investment) cost, some sharecroppers can undertake and benefit from fairly sizable fertilizer investments even under present conditions, and would very clearly be able to do so given adoption of the full range of recommended policy measures.

The focus need not be on major investments. Fertilizer has the advantage of being a highly divisible input. Even just a pound or two can be purchased by the poorest of farmers and applied with the same effect per pound that a large quantity would yield. This can be done in many cases without any additional costs for other inputs. Therefore, what limited cash the tenant may have can still be used to his benefit on fertilizer.

b. Employment

HYV rice and wheat cultivation, the growth of which will account for the bulk of increased fertilizer use during the project period, is known to be more labor intensive than cultivation of traditional varieties, provided only that the introduction of HYV's does not bring with it a significant increase in mechanization. Fortunately, the BDG, being fully cognizant of the country's very serious agricultural unemployment problem, can be counted on to keep the country on a labor-intensive development course.

Granted that HYV cultivation is more labor intensive than traditional cultivation, the extent of the additional employment to be provided has been a matter of some debate. Studies undertaken by the UNDP/FAO and Edward Clay in 1977 (15) attempted to show that even a successful HYV growth strategy would not likely lead to a rate of increase in foodgrain-related employment equal to the prospective rate of increase in the rural labor force, let alone contribute to an improvement of the situation in other areas. A separate Mission assessment of the situation (16) was less pessimistic, concluding that the rate of increase in employment in foodgrain production (which accounts for about 60 percent of the rural labor force) should at least keep pace with the rate of growth of the rural labor force. The Mission arrived at the further tentative conclusion that employment of hired labor should increase at a faster rate than employment of labor as a whole (i.e. faster than family labor), which would have favorable implications for the country's landless.

The employment effect of purely fertilizer investments is even less clear than that of investments in the full HYV technology. Much depends on the scale of fertilizer application. A study of fertilizer use by the Economist Intelligence Unit, (17) based partly on findings by Dr. Hugh Brammer, (18) found a fairly significant increase in the amount of labor required in going from "farmer use" to "recommended use" levels of application. Those findings are summarized in Table 14, which also shows the average labor requirement on local variety crops.

-
- (15) Govt. of Bangladesh-UNDP/FAO Mission, Agricultural Employment in Bangladesh, Apr. 1977, and Edward J. Clay and M. Sekander Khan, Agricultural Employment and Underemployment in Bangladesh; the Next Decade, June 1977.
- (16) USAID, Bangladesh, Employment Effects of The HYV Strategy, Jan. 23, 1978.
- (17) Economist Intelligence Unit, The Structure of the Fertilizer Market in Bangladesh, June 1977.
- (18) H. Brammer, Cost of Production, Profits and Returns For Paddy and Wheat Cultivation at the New (July 1976) Fertilizer Prices, July 1976.

Table 14

Man. Days of Labor Per Acre

<u>Crop Varieties</u>	<u>HYV Varieties With Fertilizer Use At :</u>		
	<u>Local Varieties</u>	<u>Farmer Use Levels</u>	<u>Recommended Levels</u>
Aus	58	78	90
B. Aman	40	-	-
T. Aman	58	69	77
Boro	71	102	177
Wheat	-	55	67

Whether or not the promotion of fertilizer use can improve the rural employment situation, the spread of HYV cultivation (which, again, will account for the bulk of future fertilizer use) undeniably has a greater employment creation potential than any other present or foreseeable area of economic activity. The portion of the rural labor force engaged in foodgrain production numbers some 13 million. A successful HYV - based production strategy, resulting in a 2.2 percent rate of increase in employment, ^{19/} would raise this figure to 11.5 million by 1982/83. While other avenues of rural employment creation must be explored (the USAID Rural Industries Project is one such effort), no other area offers the prospect of creating 1.5 million man-years of employment during this period.

c. Rural Displacement, Migration and Urbanization

Increased profitability of farming arising from additional fertilizer investments raises the possibility of takeovers of sharecropped land by owner-cultivators or owner-managers. Owner-managers may be further tempted to displace sharecroppers in favor of hired labor to the extent real agricultural wage rates continue their long-term downtrend.

Much will depend on the attitudes of owners which cannot be precisely foreseen. An owner may foresee a larger profit by taking over from his sharecropper and assuring a desired fertilizer investment. On the other hand, if the sharecropper were to make the investment anyway, the owner might do just as well, with less effort, by continuing to accept his half of a now larger crop. Nor can the possibility of owners making fertilizer investments on behalf of sharecroppers be entirely dismissed, even though this is now seldom done in practice.

19/ Based on findings of Mission study, Ibid.

On balance, the more likely outcome would seem to be that sharecroppers will increasingly adopt fertilizer use on their own, thereby strengthening their positions and enabling them to avoid entering the ranks of the landless.

As discussed in (b) above, the impact of fertilizer use on rural employment is expected to be favorable, though it probably cannot in itself effect a net improvement in the unemployment situation. This being the case, it cannot lead to a reduction in the rate of urban migration, but probably will keep it from rising faster than it otherwise would.

d. Changes in Power and Participation

This project will strengthen the private fertilizer retailers and will create a new group of private fertilizer wholesalers. These dealers may be formed into a trade association. The cumulative effect of these actions is considered to most likely be to create a power influence favorable to expanded fertilizer use.

4. Role of Women

Agriculture is by far the largest single sector in the economy of Bangladesh. Economic growth requires optimum utilization of agricultural resources, both human and physical.

The purpose of this project is to assist Bangladesh in increasing agricultural production by making available adequate fertilizer inputs. Although women in Bangladesh seldom work side by side with men and children in the fields, they do perform a significant role in agricultural production. There may be a great diversity, however, in the farm activities by women, depending on a family's economic status, the size of holdings, tenancy, and the nature of the particular community.

The women's busiest time is at the harvest and post-harvest season, as it is for all family members. Women have primary responsibility for winnowing and sieving newly threshed paddy, and parboiling, drying, husking and home milling of all rice used in home consumption. In addition, women perform some of the above processes for the paddy sold in the market. Women also assist with the threshing in many families. If there are not enough female family members to perform these processing functions, women day laborers are hired to assist the family members and are paid in cash or kind (often a portion of the processed paddy).

Also, the planting and maintenance of kitchen gardens located within or close to the bari (household compound) are the primary responsibility of female family members. For very poor and landless families, the surplus produce from these gardens which is not needed for family consumption is often sold for much needed cash. To the extent that the inputs of this project are available to women for use in such horticulture they will increase the yield of kitchen gardens and, as a result, also improve the nutritional and economic status of poor families.

In the realization of higher farm incomes, women and men will, of course, benefit equally from this project. Moreover, rural women could utilize part of the incremental household earnings for investments in further development of cottage industries, which provide sustenance to many a rural household, and thereby further improve their family's well-being. The opportunity for learning or improving the skills for such activity may be provided through a companion AID FY 1977 project for the National Women's Development Academy which is specifically directed to development of skills for rural women. For any new employment created within the Distribution Project, the policy of BADC is that women will be given an equal opportunity for employment and will be given equal pay for equal work.

BANGLADESH
ASHUGANJ FERTILIZER PLANT PROJECT
(Supplementary Financing)

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

I, Joseph S. Toner, Mission Director, the principle officer of the Agency for International Development in Bangladesh, having taken into account, among other things, the maintenance and utilization by the Bangladesh Government and its agencies of projects previously financed by the United States, do hereby certify that in my judgment Bangladesh has the financial and human resources capability effectively to utilize the project to be financed by this loan.

This judgment is based upon considerations discussed in the Project Paper to which this certification is attached.

Joseph S. Toner
Director

Date

COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights ? Yes, it can be demonstrated.

2. FAA. Sec. 181. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in 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, Department of State has not so determined.

3. FAA. Sec. 620(b). If assistance is to Government has ~~the~~ Secretary of State determined that it is not controlled by the International Communist movement ? Yes.

4. FAA. Sec. 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 ? No.

5. FAA.Sec.620(e). 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 ? In 1972 the BDG nationalized five firms which were fully or partially owned by U.S. entities. The BDG has announced a compensation policy and is taking steps to discharge its obligations toward U.S. citizens and entities.
6. FAA Sec. 620(f); App.Sec 108. Is recipient country a Communist Country ? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos ? a) No
b) No
7. FAA.Sec.620(i). Is recipient country in anyway 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 ? No
8. FAA.Sec.620(l). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property ? No
9. FAA.Sec.620(l). If the country has failed to institute the investment guarantee program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason ? CPIC bilateral agreement was signed January 15, 1975.
10. FAA.Sec.620(o). Fishermen's Protective Act, Sec.5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters. Not applicable.

a. has any deduction required by Fishermen's Protective Act been made ?

b. has complete denial of assistance been considered by AID Administrator ?

11. FAA Sec. 620(g):App. Sec. 504.
(a) is the government of the recipient country in default on interest or principal of any AID loan to the country ? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriate funds, unless debt was earlier disputed or appropriate steps taken to cure default ?

a) No
b) No

12. FAA Sec. 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).)

Approximately seven percent. The Soviet Union has provided a limited number of aircraft for the BDG airforce. This non-sophisticated equipment was purchased on credit at reduced prices. The BDG is not diverting development assistance funds for military expenditures.

13. FAA Sec. 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.

14. FAA Sec.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 AID Administrator in determining the current AID Operational Year Budget ? Not in arrears.
15. FAA Sec.620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism ? No
16. FAA, Sec.666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any offices or employees of the U.S. there to carry out economic development program under FAA.? No
17. FAA Sec.669. Has the country delivered or received nuclear reprocessing or enrichment equipment materials or technology, without specified arrangements on safeguards, etc. ? No
18. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? No

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account to assess commitment and progress of country in effectively involving the poor in development, on such indexes as : (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution and (5) unemployment.

1. Yes
2. Yes
3. Yes
4. Yes
5. Yes

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is :

(1) Making appropriate efforts to increase food production and improve means of food storage and distribution.

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

Increasing foodgrain production is a major objective of the Bangladesh Five Year Development Plan (FYP). Included also in the FYP are programs for storage and distribution of food.

BDG policy encourages both foreign and domestic private enterprise and investment, and in January, 1975 an OPIC bilateral agreement was concluded. In addition, the new Martial Law Administration (since November 7, 1975) has particularly emphasized the role of private enterprise, is looking to the denationalization of a number of firms, and has announced a new private sector oriented investment policy.

- (3) Increasing the public's role in the development process. Implementation of Bangladesh's development plans required a large public role in development. Cooperatives are encouraged by the Government, directly involving the public in a participation role. In addition, the national 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 and development expenditures.
- (b) Diverting such resources for unnecessary expenditures and intervention in affairs of other free and independent nations. Bangladesh's military expenditures are very low in absolute and real terms. The level of defense spending is not a diversion of development funds.
- (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 predominantly a nation of small farms, and while a large proportion of these are cultivated by shareholders and lease farmers as well as farmers who both own some land and lease or sharehold, the average area per family is under 2 acres and large holdings are the exception. Accordingly, land tenure changes while necessary in the long term equity question, are not as critical an element for the development of Bangladesh as for other IDCs. On the other question, the new

Martial Law Administration has evidenced a concern for each of these; this has been manifested through tighter public administration return of newspapers to private control, and encouragement of private enterprise. Recognition of the importance of individual freedom and initiative also appear to be marks of the new Government. Martial Law has been extended to the country in what appears principally to be an effort to clear up carry-over problems of corruption and abuse of power. Respect for the rule of law is stated as underlying the current measures.

- (6) 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 new Government evidences a concern for these questions and has been taking action to improve the public service, to release economic activity from constraints formerly imposed by governmental intervention, and to alleviate conditions of the people through rural works programs, food for work and other self-help programs.
- (c) FAA Sec.201(b),211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made ? Yes .
- (d) FAA Sec.115. Will country be furnished, in same fiscal year, either security supporting assis- No

tance or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

2. Security Supporting Assistance Country Criteria

- a. FAA Sec.502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is Program in accordance with policy of this Section? No, Program is in accordance.
- b. FAA Sec.531. Is the Assistance to be furnished to a friendly country organization, or body eligible to receive assistance? Not applicable
- c. FAA Sec.609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? Not applicable.
- e. App. Sec.113 Will security Assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country to the Universal Declaration of Human Rights? Not applicable.

C. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

(a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;

(b) Is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%) ?

a) A Congressional Notification will be prepared and filed prior to authorization.

b) This funding requirement was not included in the FY 78 OYB because the exact amount and the timing were not clarified until the end of the BPSI evaluation.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, 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 U.S. of the assistance?

a) Yes

b) Yes

3. FAA Sec. 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 the assistance?

Not applicable

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Not applicable

5. FAA Sec. 611(e). If project is capital assistance (e.g. construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project ?
- Yes, certificate included herein.
6. FAA Sec.209,619. Is project susceptible of execution as part of regional or multi-lateral project ? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate ?
- The project is being funded on a multilateral basis. Seven donors are participating.
7. FAA Sec.601(a);(andSec. 201(f) for development loans). Information and conclusions whether project 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 project may increase foreign trade if fertilizer production surpluses are achieved in the future. It will indirectly contribute towards freer trade and cooperative development by stabilizing adequate supplies of fertilizer for farmers. The plant will be a modern and highly efficient industrial unit.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise). The plant will undoubtedly lead to follow on trade opportunities for materials and equipment supply and Technical assistance services.
9. FAA Sec. 612(b); Sec. 635(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 U.S. are utilized to meet the cost of contractual and other services. The host country contribution is almost 100 percent local currency. All contractor services local cost will be paid with US owned TAMA.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release ? No.

FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

- a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out Use of modern agricultural inputs and increased productivity should result in chance for improvement in incomes of the rural poor, thereby helping to

from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions ?

give them a basis for greater participation in development, including participation in the development of and through cooperatives. The urban poor are not really addressed by the project, except to the extent rural development takes place, migration of the rural poor to the cities may be reduced.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph -- e.g. a, b, etc.-- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source).
(1) (103) for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; (103A) if for agricultural research. is full account taken of needs of small farmers.

All aspects of the project are directed towards increasing fertilizer use and agricultural production in an equitable way. It is not possible to say what portion will accrue to the rural poor.

c. FAA Sec. 110(a); Sec 208(e).
Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country) ?

BDG will be providing for in excess of 40 percent of the project costs.

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

Not applicable.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) 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 (6) integrating women into the recipient country's national economy.

The project directly contributes to the country's self-help efforts to increase foodgrain production and meet its own food needs. Although it is not specifically directed to training of manpower or development of the institutions under (1) whatever rural income increase results from the project should assist in development or support of a rural standard of living; in augmented incomes lies the greater potential for encouraging such institutions. Similarly, health and increased roles for women, although not specifically addressed by the project, should benefit from any increase in rural income and living standards. For the items under (5), development of heavy industry can be expected to result from the success of this project; the other items under (4), are not sufficiently related to the project objectives to include comment

f. FAA Sec. 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 project is specifically targeted to the basic rural development and foodgrain production needs of the country. The accomplishment of the objectives of the project may result in increased cooperative activity and greater participation by the poorer and rural population, thus involving greater participation in basic self-government type activities and development of institutions.

g. FAA Sec. 201(b)(2)-(4) and -8; Sec. 201(e); Sec. 211(a) (1)-(3) and -8). Does the activity give reasonable promise of contribution to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

The project contributes directly to increased agricultural production and indirectly to other aspects of rural development. It is related to and consistent with other projects, contributes to long range goals. The PP documents the project's economic and technical soundness.

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance 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 or safeguarding the U. S. balance-of-payments position.

Approximately 80% of the project expenditures will accrue to US suppliers of industrial equipment and services.

STANDARD ITEM CHECKLIST

D. Procurement

1. FAA Sec. 602. Are there arrangements to permit U. S. small business to participate equitably in the furnishing of goods and services financed? Yes.

2. FAA Sec. 604(a). Will commodity procurement be financed from the U. S. except as otherwise determined by the President or under delegation from him? Yes.

3. FAA Sec. 604(d). If the cooperating country discriminates against U. S. marine insurance companies, will agreement require that marine insurance be placed in the U. S. on commodities financed? **Yes, agreement will so provide.**

4. FAA Sec. 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? **Not Applicable.**

5. FAA Sec. 608(e). Will U. S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? **Yes.**

6. MMA Sec. 901(b). (a). Compliance with requirement that at least 50 percent of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners and tankers) financed shall be transported on privately owned U. S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. **Project Agreement will so provide.**

7. FAA Sec. 621. If technical assistance is financed, will such assistance 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 are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? **Yes.
Not Applicable.**

8. International Air Transport Fair
Competitive Practices Act, 1974

If air transportation of persons or property is financed on grant basis, will provision be made that U.S. flag carriers will be utilized to the extent such service is available? **Yes.**

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? **Yes.**

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? **Yes.**

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million? **Aggregate value of U.S. assistance will not exceed \$100 million.**

C. Other Restrictions

1. FAA Sec. 201(d). If development loan is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? **Yes**

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization does Comptroller General have audit rights? **Not Applicable.**

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of communist-Bloc countries, country to the best interests of the U.S. ? **Yes.**

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U. S. or guaranty of such transaction? **Such is not permitted.**
5. Will arrangements preclude use of financing:
- a. FAA Sec. 114: to pay for performance of abortions or to motivate or coerce persons to practice abortions? **Yes.**
 - b. FAA Sec. 620(a). to compensate owners for expropriated nationalized property? **Yes.**
 - c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? **Yes.**
 - d. FAA Sec. 662. for CIA activities? **Yes.**
 - e. App. Sec. 103. to pay pensions, etc., for military personnel? **Yes.**
 - f. App. Sec. 105. to pay U. S. assessments? **Yes.**
 - g. App. Sec. 106. to carry out provisions of FAA Sections 209(d) and 251(h) (transfer to multilateral organization for lending). **Yes.**
 - h. App. Sec. 501. to be used for publicity or propaganda purpose within U. S. not authorized by Congress? **Yes.**

Lenders' Supervision Report

The material following in this Annex are extracts from the combined Lenders' supervision mission in Bangladesh during December, 1977. The purpose of this mission was to evaluate the implementation status of the project and set the stage for a full lender appraisal prior to supplementary financing actions. The complete report is on file in ASIA/PD. Other information and evaluation conclusions of this supervision mission are contained elsewhere in this Project Paper.

BANGLADESH - ASHUGANJ FERTILIZER PROJECT

List of Persons Met by the Supervision Mission
(December 1977)

General Contractor

(Foster Wheeler Ltd.)

Mr. Coleman, Site Construction
Manager

USAID

Mr. Toner, Director, Bangladesh
Mission

Mr. Love, USAID, Washington

Mr. Kenefick, USAID, Washington

Mr. Groceman, Bangladesh Mission

AFCC

Mr. Ruhul Quuddus, Finance Director

Mr. Rafiqudin Ahmed, General Manager

Mr. Eunos, Construction Engineer

Mr. Rhaman, Engineer

Mr. Haque, Civil Engineer

Management Assistant Firm
(Valley Nitrogen Producers, Inc.)

Mr. Elvis B. Lee, VP Manufacturing

Mr. Ed Samuels, AFCC Project Director

Mrs. Medley

BFCC

Mr. Shamsul Huq, Chairman

ADB

Mr. Grope, Senior Engineer

KfW

Mr. Janisch

Mr. Meyer-Gode

U.K. High Commissioner, Dacca

Mr. McCulloch

Embassy of Switzerland
(Dacca)

Mr. Etienne, Commercial Attaché

IBRD Resident Mission

Mr. Colliou of the RM joined the
mission through its stay in
Bangladesh

(Lender's Supervision Report)

Summary of Project Status, Trend and Major Problems
(Taken from Bank Supervision Mission Report, dated 2/24/78)

Process engineering work is 95% complete and the project is entering the construction phase which should commence in February 1978, slightly ahead of the final completion of soil compaction. The revised project schedule calls for project completion by September 1980 (i.e. 26 months later than expected at appraisal) assuming no further delays occur. The most critical phase in that respect is construction. With soil compaction likely to be on schedule, the rapid approval of the compensatory foundations subcontract, and the settling of part of the cement supply and labor training problems, this phase starts under relatively favorable conditions. Several critical issues need however to be promptly resolved with respect to the scope and timely award of a number of critical international subcontracts, procurement and shipping of construction equipment and materials, and the need for a coherent construction planning and monitoring system. Procurement for the main equipment units is to a large extent complete but a number of issues remain to be solved with respect to letters of credit management, procurement of ancillary items and local procurement, and logistics management. Erection could be hampered by skilled local labor shortages. The company (AFCC) continues to face major management problems, primarily lack of planning and monitoring of project progress and contractors work, slow decision-making, lack of communications with the general contractor, and difficulties with the management assistance team. The Government is undertaking a reorganization and intends to replace some expatriates by Bangladeshi and to change the overall scope of expatriate assistance. Higher approval authority levels will be granted to the Project Director and the Board which is being strengthened by the inclusion of high ranking Government officials. The lenders are following these matters closely, and have hired a Project Management Consulting Team for a period of about 3 months to define practical solutions to the management problems and develop effective systems and

and procedures in such critical areas as planning and scheduling, cost control and cost/time tradeoffs, labor and material logistics, and construction management. The Team will start working in Dacca on February 27, 1978, and is also expected to provide the Lenders with an assessment of Project cost, progress and prospects prior to their considering supplementary financing. Training of maintenance staff has started and progress is being made in developing a more cost effective local and overseas training program for plant operators. Because of AFCC's uncompetitive proposed pay scales and the continued loss of skilled Bangladeshi labor to the Middle-East, the company could however face a difficult problem with respect to the quantity and/or quality of its operating personnel. The Government has submitted to the Lenders a revised capital cost estimate of U.S. \$388.7 million (including interest during construction and working capital) out of which U.S. \$188.2 is foreign exchange. For a number of reasons, the BDG estimate cannot be accepted as final, and foreign exchange costs are in particular likely to exceed U.S. \$200 million. The Management Consulting team and the lenders will evaluate the BDG budget and arrive at a suitable projected budget. Although only U.S. \$75 million (including U.S. \$60 million in foreign exchange) were disbursed as of the end of 1977, U.S. \$130 (including U.S. \$115 million in foreign exchange) were committed at that time. Since existing foreign exchange sources (ADB, USAID, IDA, KFW (Germany), ODM (U.K.), Governments of Iran and Switzerland) of about U.S. \$140 million will be fully committed by June 1978, supplementary foreign exchange financing will need to be on hand at that time. Based on the latest capital cost estimate and the revised project schedule, the Project's economic return is about 12.4% compared to 21% at appraisal and it takes a combination of a number of unfavorable assumptions to bring it below 10%. If one were to consider that approximately 50% of the current expenditures are sunk costs, the adjusted economic return would be 15.5%. This relatively attractive revised economic return reflects the low economic opportunity value of the Project's natural gas feedstock and the fact that because only one-fifth of project costs have actually been expended to date, the delay and overrun have only partially affected the Project's economic return. The expected before tax financial return of the Project has declined from 14% to 10% since appraisal but a possible 5-year income tax waiver could help AFCC maintain a satisfactory debt service coverage ratio even after supplementary financing.

Summary of Actions Taken or to be Taken

The Government and IDA on behalf of the Lenders agreed on December 13, 1977 on an Aide-Memoire containing, besides their stated agreements and viewpoints with respect to the desirable organizational structure of AFCC, a number of actions to be taken by AFCC and the Government. Several of the more important steps recorded in the document have been taken within the targeted dates and an IDA/USAID mission visiting Bangladesh starting February 27, 1978 will review the status of the remaining ones. The Aide-Memoire also addresses the issue of supplementary financing and provides a tentative timetable for the Lenders to study the possibility of committing additional foreign exchange resources to the Project. The Project Management Consulting Team hired by the Lenders is expected to provide the Lenders by May 1978 with an assessment of the Project's cost, progress and prospects as a basis for the Lenders' reappraisal.

ASHUGANJ FERTILIZER PROJECT

AIDE MEMOIRE

Having jointly reviewed the status of this Project and having discussed the need for timely action in several critical areas, representatives of the Government, AFCC and the Lenders have reached agreement on the measures required to expedite decisions that are needed to complete the Project without further delays and consequent cost increases. This memorandum sets forth the agreement reached on (i) changes in the Company's organization, management and operating procedures; (ii) actions required to be taken by the parties at the earliest opportunity in connection with project implementation; and (iii) measures to ensure adequate and timely commitment by Government and the Lenders of local and foreign exchange resources for the Project.

1. ORGANIZATIONAL ARRANGEMENTS

(a) The Lenders will appoint, outside the project budget, an experienced Project Management Consulting Team as soon as possible to assist the Lenders as part of their appraisal process. Amongst other things, advice will also be sought from this team on systems and procedures in areas such as planning and scheduling, cost control and cost/time trade-offs, labour and material logistics, construction and management etc. which would enable the project to be managed effectively and completed on schedule in the most economic manner. Recommendations of this team would be made available to AFCC for consideration and action as appropriate.

(b) As it has been identified that the present arrangements of AFCC with their advisers (TA/VNP) have not been satisfactory in providing for effective project management, these will have to be realigned with corresponding changes in the AFCC organizational structure. The Lenders pointed out that an essential feature of the reorganization should lie in the establishment of an autonomous Project Unit with sufficient expertise, motivation, and approval/disbursement authority to act decisively within the time and Project budget agreed between the Government and the Lenders. Consideration should be given to establishing adequate levels of authority and designating key personnel for the Project Unit based on the recognition that the utmost emphasis should be placed on avoiding further delays (estimated to add \$3.5 million per month to project costs) rather than on attempting to achieve limited and topical cost reductions and on seeking time consuming justifications for schedule-critical activities. It is recognized that while the direct role of TA will be gradually diminishing, the organization of the VNP has to be reorganized and strengthened in order that they can provide competent and effective management service towards project implementation which has not been satisfactorily available hitherto. With this objective, AFCC will give option to VNP to renegotiate their agreement to recruit and depute to the project such staff in substitution and addition to the present personnel as would be necessary to assist

AFCC more effectively in project execution and subsequently in operation. AFCC intends that the service to be rendered by VNP under the new arrangements will be on counterpart basis and that the Company will also restructure its own organization and appoint a competent Project Director who will have the expatriate Project Manager of the VNP or any other management firm in its place as his counterpart. The subordinate key personnel of the PD will also have corresponding expatriate experts of the management firm to assist in project execution. Sufficient authority will be delegated to the PD and the subordinate staff of the AFCC in consonance with the Company's procedures so that the day to day decisions connected with project execution are not delayed to the detriment of the project. A draft reorganization chart will be made available to the Lenders by January 15, 1978.

(c) The Company's new organization will provide for sufficient delegated authority to establish and carry out an effective training program and create the necessary system (e.g. cost control, maintenance, spare parts and inventory systems, marketing) that will enable the plant to function effectively after commissioning.

(d) AFCC will set the terms and conditions of employment for management and staff so that it can attract and retain the necessary personnel.

(e) A review of the existing FWL contract will be undertaken by AFCC in consultation with the Lenders to determine adjustments that are needed to ensure that adequate services are provided to enable the completion and startup of the plant on schedule and at minimum cost.

2. IMMEDIATE ACTIONS TO BE TAKEN TO AVOID FURTHER DELAYS

(a) The civil works tender for compensatory foundations should be evaluated by FWL and AFCC in Reading beginning January 4, 1978. The bidders for this subcontract will be advised as soon as possible to include a provision that cement and if necessary any other critical materials be furnished by the subcontractor. The Lenders and the Government will make suitable arrangements for obtaining expeditious approvals for contract award.

(b) Import licenses/permits covering project requirements for cement as necessary will be issued promptly by the Government. Prior to February 1, 1978 provision will be made in the tender documents of civil works subcontracts that international contractors will supply cement and other materials necessary to complete the requisite works. The Government will promptly authorize the importation of equipment and other materials required by contractors.

(c) AFCC, VNP and FWL should clarify the status of equipment, spares and materials procurement actions, and approvals given to FWL to immediately purchase and ship all items required to maintain the project schedule.

(d) A purchase order for a second turboalternator required for the plant should be placed prior to January 15, 1978.

(e) In order to minimize the time taken for communicating among the parties responsible for project implementation, AFCC, VNP and FWL will immediately institute a more effective means of communication than has obtained hitherto. To this end FWL will be asked to send to Dacca as soon as possible a representative empowered to make critical decisions on behalf of FWL/Reading.

(f) Following a review in Reading beginning December 12, 1977 AFCC, VNP and FWL will decide by January 15, 1978 on the appropriate division of labour (direct, local contract, vendors' specialists and expatriate contractors), and the mixture of subcontract services for the identifiable construction and erection packages required to meet the demands and time constraints of the overall project schedule.

(g) Following the above decisions on construction methods, AFCC, VNP and FWL must promptly adjust the program for training construction labour and begin implementing the revised program. In order not to delay the commencement of the training program, procurement of requisite materials required for training will be initiated immediately. Furthermore, approvals to enter Bangladesh for those Foster Wheeler construction Supervisors required to implement the agreed training program will be given expeditiously.

(h) Subcontracts for foundations and buildings in addition to those for the compensatory foundations will be expeditiously awarded. If deemed necessary, the procedure outlined under (a) above will be followed.

(i) AFCC will take all necessary action to ensure that progress reports for each month's activities are received by the Government and the Lenders within thirty days of the end of the month whose activities are being reported, and that the reports are in sufficient detail to adequately apprise Government and the Lenders of the problems facing the Project and of measures proposed to resolve them.

3. SUPPLEMENTAL FINANCING

The following steps are agreed as necessary to secure additional local and foreign exchange resources required to complete the Project:

(a) Request by December 31, 1977 by the Government to the Lenders for the provision of additional foreign exchange funds.

(b) By December 31, 1977 initiation by the Government of the necessary revisions to the Project Proforma.

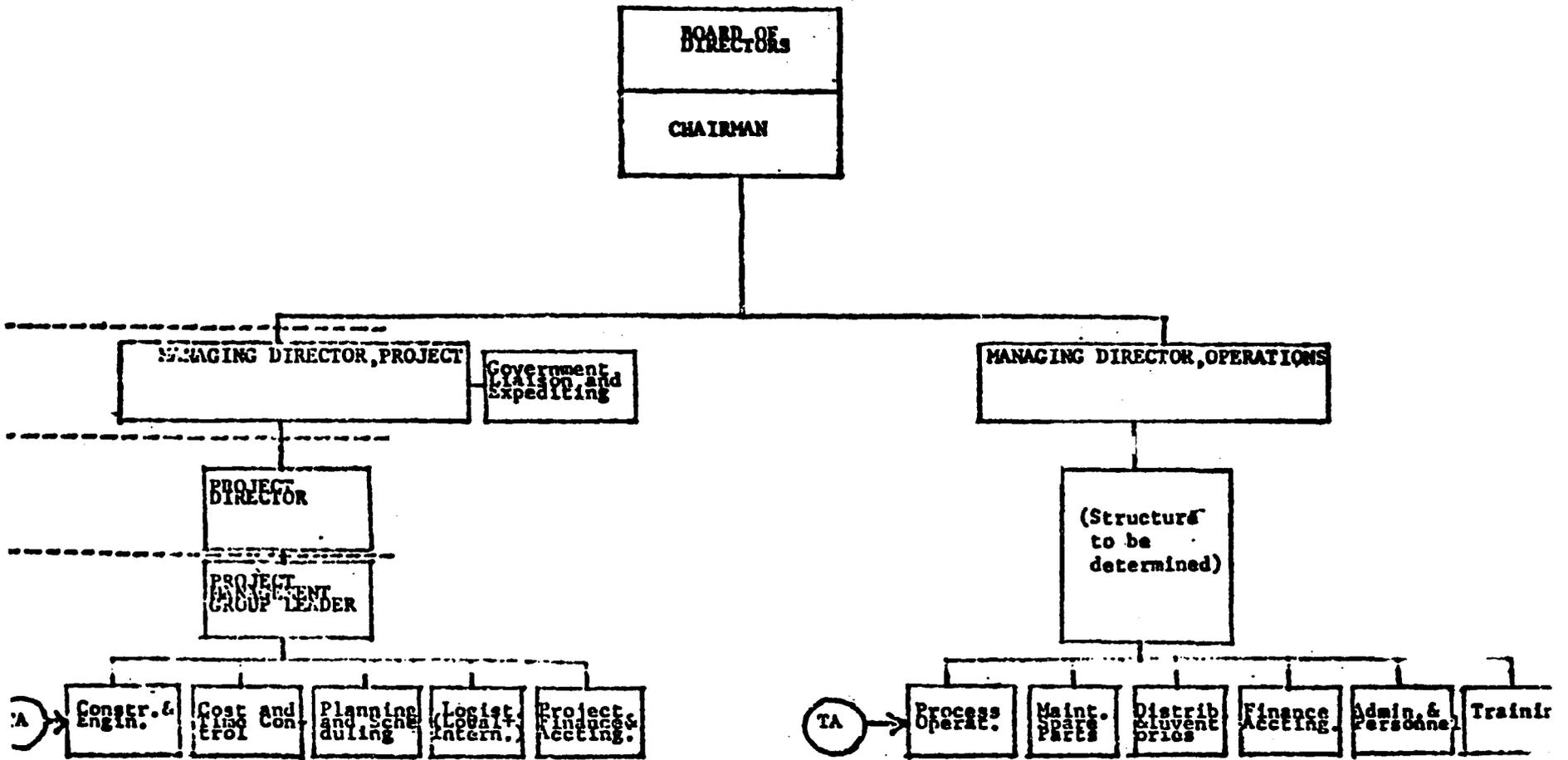
(c) The appointments of personnel to key positions within the Project Unit will be completed by February 15, 1978 and after consultations with the Lenders. It is agreed that sufficient approval/disbursement authority will be delegated to those officials and the same intimated to the Lenders. The Lenders have proposed that the Project Director receive authority to commit and disburse up to equivalent of US\$1.3 million presently vested in AFCC, and that this authority will be delegated by him as necessary so as to enable the Project Unit to act decisively. This will be kept in view by AFCC in determining the scale of delegated authority to the Project Director.

(d) Project reappraisal by the Lenders.

Preparation by the Lenders for a re-appraisal is already in hand and it is expected that the Lenders' appraisal will be completed by March 31, 1978. Lenders will be in a position to seek approvals to commit additional foreign exchange resources for the Project by June/July 1978; it is required that in the meantime AFCC will have effectively carried out the activities mentioned herein before.

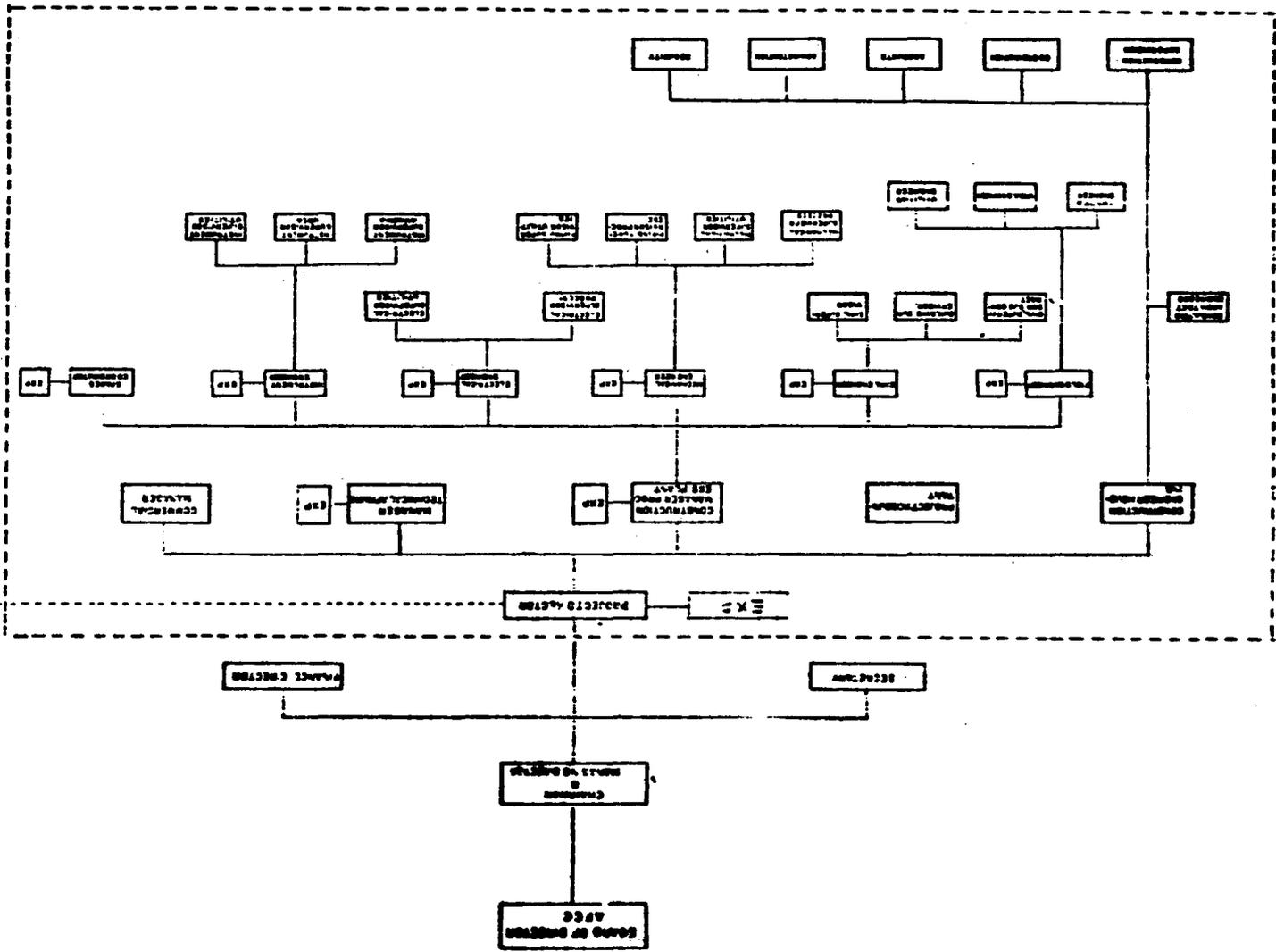
December 13, 1977

AFCC - REVISED ORGANIZATION CHART (Commanders' proposal)

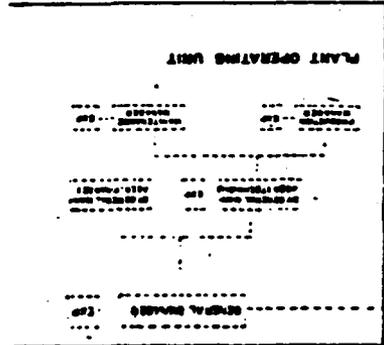


(PROJECT IMPLEMENTATION UNIT)

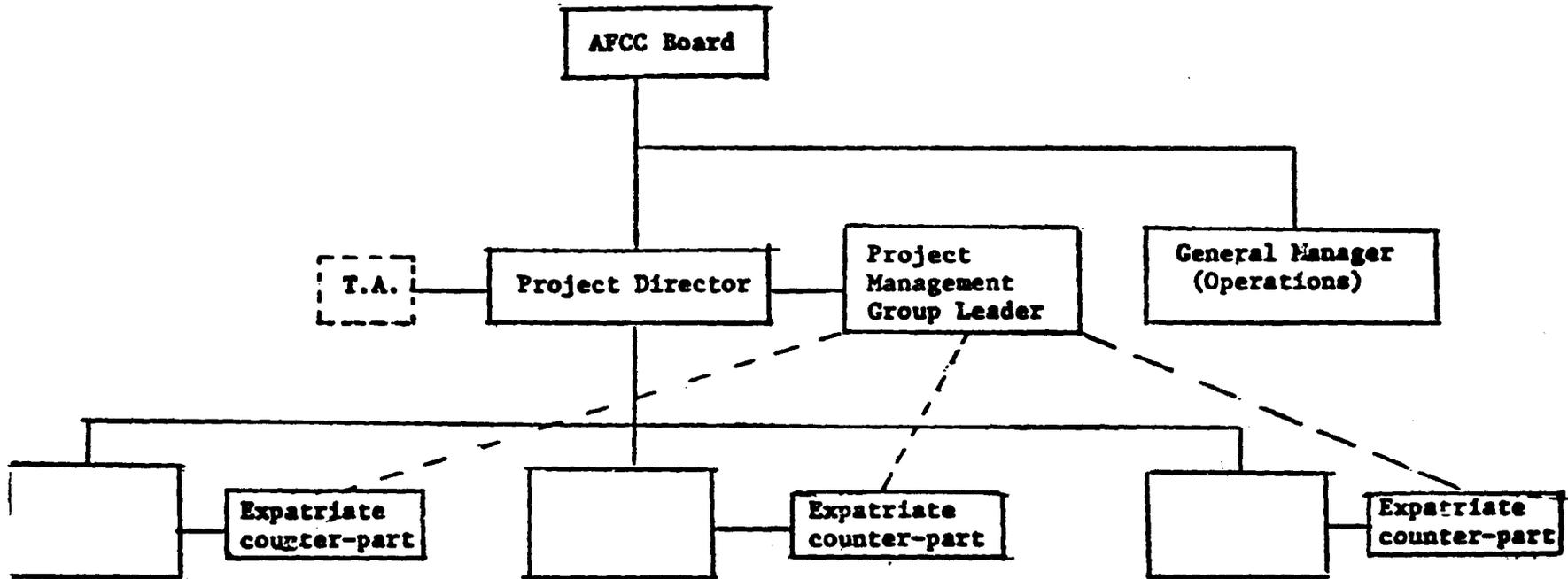
ANNEX F
Page 11 of 12



ASHUGANJ FERTILIZER PROJECT ORGANIZATION CHART



AFCC - Revised Project Organization Chart - (AFCC proposal)



**Williams Brothers Process
Services, Inc.
Management Improvement Recommendation
and Implementation Plan***

***The entire WBPSI proposal will be on file in ASIA/PD Office
for reference.**

ASHUGANJ FERTILIZER PROJECT
(Supplementary Financing)

Project Description

The Project consists of the design, construction, commissioning and initial operation of a new ammonia/urea fertilizer plant complex (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. Engineering, design and procurement of equipment (including chemicals, catalysts and spare parts for initial operation) for, and construction of:
 - (a) an intermediate ammonia unit with a designed production capacity of 925 metric tons per stream day;
 - (b) a urea unit with a designed production capacity of 1600 metric tons of prilled urea per day, and
 - (c) utilities, offsites and supporting facilities for the ammonia and urea units.
3. Provision of construction equipment and materials.
4. Construction of a staff housing colony, including common facilities, for personnel to be employed in the management and operation of the Plant.
5. Engagement of Technical Services to advise and assist AFCC during construction and commissioning of the Plant.
6. Engagement of a Management Group to provide AFCC with professional and technical skills needed during construction, commissioning and initial operation of the Plant.
7. Training of AFCC personnel in the management and operations of the Plant.

The Project shall be deemed to have been completed as of the date when both of the following events have occurred: (i) the General Contractor referred to in the Project Agreement shall have certified to AFCC and to AID that the plant has met the performance tests specified in the contract between AFCC and the General Contractor, and (ii) the Plant has produced prilled urea at the rate of eighty percent (80%) of its rated urea capacity (in the aggregate for a sixty (60) consecutive days. The Project is expected to be completed by March 31, 1981.

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 AID, Eligible Items shall be, subject to modification by AID hereafter in writing, goods and services related with the following general input categories:

1. Ammonia Storage, Refrigeration and Bottling.
2. Condensate Stripper, Water Treatment and Cooling Towers.
3. Sewer and Effluent Treatment
4. Construction Equipment and Materials
5. Transport Equipment, Boats and Vehicles
6. Bagging and Bag Making Equipment
7. Site Preparation and other Construction Services
8. Technical and Management Services related to construction and commissioning.
9. Miscellaneous Offsites, Chemicals and Catalysts and Spare Parts for construction and operation.

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

ANNEX J
Draft Loan Authorization
Page 1 of 2

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

BANGLADESH

Ashuganj Fertilizer Project
A.I.D. Loan No. 388-0016

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a loan ("Loan") to the Peoples' Republic of Bangladesh the "Cooperating Country" of not to exceed twenty-three million United States Dollars (\$23,000,000) the ("Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the Project as described in the following paragraph.

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, Iran, the Asian Development Bank (collectively referred to 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, commissioning and operation of a urea fertilizer plant and all appropriate ancillary facilities at Ashuganj, Comilla, Bangladesh, together with the provision of management and consultant's services and training.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and conditions:

1. Interest and Terms of Repayment:

Borrower shall repay the Loan to A.I.D. in United States dollars within forty (40) years from the date of the first disbursement under the loan, including a grace period not to exceed ten (10) years. Borrower shall pay to A.I.D. in United States dollars on the disbursed balance of the Loan interest at a rate of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter.

2. Source and Origin:

Unless otherwise agreed by A.I.D. in writing, goods and services (including ocean shipping and marine insurance) financed under the Loan shall have their source and origin in countries which are included in Code 941 of the A.I.D. Geographic Code Book. Marine insurance may be financed under the Loan if it is obtained on a competitive basis and any claims thereunder are payable in freely convertible currencies.

3. Other Terms and Conditions

Prior to any disbursement or the issuance of commitment documents, the Borrower shall furnish 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 the Agreement or Amendment making available these funds 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) Such other terms and conditions as A.I.D. may deem advisable.

Signature _____
Administrator

Date